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ABSTRACT

This document contains vocational education program courses standards for exploratory courses, practical arts courses, and job preparatory programs offered at the secondary or postsecondary level. Each program standard is composed of two parts: a curriculum framework and student performance standards. The curriculum framework includes four major sections: major concepts/content, laboratory activities, special notes, and intended outcomes. Student performance standards are listed for each intended outcome. For secondary job preparatory programs, courses have been designated with student performance standards listed for each course. Standards are provided for orientation to American industry occupations; exploration of occupations in construction, graphic communications, manufacturing, and power and transportation; practical graphic communications, home mechanics, power mechanics and energy, industrial skills, and industrial systems; and pretechnical construction, drafting, electronics, energy and power, graphic arts, and materials and processes. (YLB)

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VOCATIONAL EDUCATION

PROGRAM COURSES STANDARDS

INDUSTRIAL ARTS EDUCATION

July, 1987

FLORIDA DEPARTMENT OF EDUCATION
Division of Vocational, Adult, and Community Education
Bureau of Vocational Program and Staff Development
Program and Staff Development Section
Tallahassee, Florida 32399

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FOREWORD

Section 228.041 Florida Statutes defines vocational education as consisting of four categories or types of instruction:

1. Exploratory courses designed to give students initial exposure to skills and attitudes associated with a broad range of occupations in order to assist them in making informed decisions regarding their future academic and occupational goals;

2. Practical arts courses designed to teach students practical generic skills which, though applicable to some occupations, are not designed to prepare students for entry into a specific occupation;

3. Job preparatory programs designed to provide students with the competencies necessary for effective entry into an occupation;

4. Supplemental courses designed to enable persons who are or have been employed in a specific occupation to upgrade their competencies in order to re-enter or maintain stability or advance within their occupations.

This document contains vocational education program courses standards (curriculum frameworks and student performance standards) for exploratory courses, practical arts courses and job preparatory programs offered at the secondary or postsecondary level as a part of Florida's comprehensive vocational education program. Vocational education program courses standards are established pursuant to Section 233.0682, Section 240.355, Section 233.011, and Section 232.2454, Florida Statutes, for school districts and community colleges. State Board of Education Rule 6A-6.571, Criteria for Qualification for Special Vocational-Technical Education Program Courses, provides the basis for the development and dissemination of this document.

Each program courses standard is composed of two parts: a curriculum framework and student performance standards. The curriculum framework includes four major sections: major concepts/content, laboratory activities, special notes, and intended outcomes. Student performance standards are listed for each intended outcome. For secondary job preparatory programs, courses have been designated with student performance standards listed for each course.

The standards do not prescribe how instruction should be delivered since decisions relative to the delivery of instruction must be made by school districts and community colleges within the context of local conditions. The Division of Vocational, Adult, and Community Education, Florida Department of Education, supports the belief that competency-based vocational education is the most effective means of providing programs and courses that conform to these established standards.

Program and course standards are based upon competencies required for entry, advancement, and upgrading in occupations in the vocational program areas of Agriculture, Business, Diversified, Health Occupations, Home Economics, Industrial Arts, Industrial, Marketing, and Public Service Education. Standards for courses designed for handicapped, disadvantaged, and other special needs persons are also provided. The standards are reviewed annually and revised as needed based upon changes in occupations utilizing input from business and industry employers, licensing and credentialing agencies, professional associations, state technical committees, and other representatives of the private sector.

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INDUSTRIAL ARTS EDUCATION

Industrial arts education pertains to courses organized for the development of understanding about modern industry and technology. The concepts taught are organized around, but not limited to, industrial categories of graphic communications, construction, energy and power, manufacturing, and supporting content areas. Learning experiences and activities are conducted in a laboratory setting including experimenting, designing, constructing, evaluating, and using tools, machines, materials, and processes.

Consistent with individual abilities, interests, and needs, the student will:

1. Interpret the evolution and relationships of society, industry, and technical means.

2. Establish beliefs and values based on the impact of industry and technology on all aspects of life.

3. Develop abilities in the proper use of tools, science principles, and appropriate technology applied to materials and processes.

4. Develop problem solving abilities using technical means.

5. Explore and develop human potentials related to responsible work, leisure, and citizenship roles in a technological society.

6. Apply basic skills in English, mathematics and science appropriate to technology content, instruction, and laboratory activities.

CURRICULUM FRAMEWORK PROGRAM AREA: Industrial Arts

FLORIDA DEPARTMENT OF EDUCATION EFFECTIVE DATE: July, 1987

COURSE TITLE: Orientation to American Industry Occupations

CODE NUMBER: Secondary 8600110 Postsecondary _____

Florida CIP IA21.0111OR

SECONDARY SCHOOL CREDITS .5 COLLEGE CREDITS _____ POSTSECONDARY ADULT VOCATIONAL CREDITS _____

APPLICABLE LEVEL(S): x 7-9 _____ 9-12 _____ Postsecondary Adult Vocational

_____ Postsecondary Vocational x Other 21

CERTIFICATION COVERAGE: INDUS ARTS 4 @ 6 METALS 4
WOODWORK 4 GEN SHOP @ 4

I. MAJOR CONCEPTS/CONTENT: The purpose of this course is to orient students to the kinds and levels of work performed in American industry. Laboratory experiences revolving around the four occupational categories of graphic communications, construction, manufacturing, and power and transportation will allow students to explore the requisites and special skills for careers in American industry. Laboratory experiences will acquaint students with the organization, functions, and evolving technologies in American industry.

The content includes, but is not limited to, the study of industrial enterprise in America with emphasis on organization, functions, occupations, special skills, safety, human relations, leadership, and evolving technologies.

II. LABORATORY ACTIVITIES: Instruction and learning activities are provided in a laboratory setting using hands-on exploratory experiences with the tools and materials related to the content.

III. SPECIAL NOTE: The Florida American Industrial Arts Student Association is the appropriate student organization for providing leadership training experiences and for reinforcing specific vocational skills. When provided, these activities are considered an integral part of this instructional course.

IV. INTENDED OUTCOMES: After successfully completing this course, the student will be able to:

01. Identify kinds and levels of work common to American industry.
02. Perform special skills unique to each of the four industrial categories of graphic communications, construction, manufacturing, and power and transportation.
03. List requisites and employment opportunities for employment in American industry.
04. Display an understanding and appreciation for the dignity and worth of honest labor.
05. Express a knowledge of the essential elements of industrial organization.
06. Use proper and safe procedures in the American industry laboratory.
07. Identify evolving technologies in American industry.
08. Demonstrate computer literacy.
09. Demonstrate leadership and organizational skills.
10. Apply basic skills in English, mathematics, and science appropriate to technological content and learning activities.
11. Make an informed and meaningful occupational choice.

STUDENT PERFORMANCE STANDARDS EFFECTIVE DATE: July 1987

PROGRAM AREA: INDUSTRIAL ARTS SECONDARY NUMBER: 8600110

COURSE TITLE: ORIENTATION TO AMERICAN INDUSTRY OCCUPATIONS

01.0 IDENTIFY KINDS AND LEVELS OF WORK COMMON TO AMERICAN INDUSTRY--The student will be able to:

01.01 Identify kinds of work as an industrial craftsman.
01.02 Identify kinds of work as an industrial technician.
01.03 Identify kinds of work as an industrial engineer or scientist.
01.04 Identify kinds of work in industrial management.
01.05 Identify other kinds of industrial work.

02.0 PERFORM SPECIAL SKILLS UNIQUE TO EACH OF THE FOUR INDUSTRIAL CATEGORIES--The student will be able to:

02.01 Perform special skills unique to graphic communications occupations.
02.02 Perform special skills unique to construction occupations.
02.03 Perform special skills unique to manufacturing occupations.
02.04 Perform special skills unique to power and transportation occupations.

03.0 LIST REQUISITES AND EMPLOYMENT OPPORTUNITIES FOR EMPLOYMENT IN AMERICAN INDUSTRY--The student will be able to:

03.01 List occupations, job requirements and employment opportunities in the graphic arts industry.
03.02 List occupations, job requirements and employment opportunities in the construction industry.
03.03 List occupations, job requirements and employment opportunities in the manufacturing industry.
03.04 List occupations, job requirements and employment opportunities in the power and transportation industry.
03.05 List related occupational and academic courses available at the secondary and postsecondary levels.

04.0 DISPLAY AN UNDERSTANDING AND APPRECIATION FOR THE DIGNITY AND WORTH OF HONEST LABOR--The student will be able to:

04.01 Form an understanding and appreciation for work after listening to or observing industrial workers.
04.02 Form an understanding and appreciation for work after performing simulated industrial work in the laboratory.
04.03 Form an understanding and appreciation for the roles of co-workers.

05.0 EXPRESS A KNOWLEDGE OF THE ESSENTIAL ELEMENTS OF INDUSTRIAL ORGANIZATION--The student will be able to:

05.01 Outline the main functions of research and development, personnel management, production, quality control, and marketing.
05.02 Participate in a simulated industrial organization incorporating the five above elements.

06.0 USE PROPER AND SAFE PROCEDURES IN THE AMERICAN INDUSTRY LABORATORY--The student will be able to:

06.01 Follow lab safety rules and procedures.
06.02 Demonstrate good housekeeping at work station and within total laboratory environment.
06.03 Use tools and machines and equipment in a safe manner.
06.04 Exercise care and respect for all tools, equipment, and materials.
06.05 Identify OSHA color coding safety standards.
06.06 Follow instructions.
06.07 Explain fire prevention and extinguishing safety precautions and practices.

07.0 IDENTIFY EVOLVING TECHNOLOGIES IN AMERICAN INDUSTRY--The student will be able to:

07.01 List evolving technologies in American industry.
07.02 Report on a recent or evolving technology in American industry.

08.0 DEMONSTRATE COMPUTER LITERACY--The student will be able to:

08.01 Define terms related to computer parts and usage.

08.02 List ways in which computers are used in American industry.
08.03 Discuss advantages and disadvantages in the use of computers.

09.0 DEMONSTRATE LEADERSHIP AND ORGANIZATIONAL SKILLS--The student will be able to:

09.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
09.02 Identify employability skills required to hold a job in industry.
09.03 Work cooperatively with others.

10.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

10.01 Apply basic English skills while completing selected written and verbal technological assignments.
10.02 Apply basic mathematical skills while completing selected technological assignments.
10.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

11.0 MAKE AN INFORMED AND MEANINGFUL OCCUPATIONAL CHOICE--The student will be able to:

11.01 Make a tentative occupational choice based on the information learned and interest developed in this course.

FLORIDA DEPARTMENT OF EDUCATION EFFECTIVE DATE: July, 1987

COURSE TITLE: Exploration of Construction Occupations

CODE NUMBER: Secondary 8600210 Postsecondary _____

Florida CIP IA21.0112EX

SECONDARY SCHOOL CREDITS .5 COLLEGE CREDITS _____ POSTSECONDARY ADULT VOCATIONAL CREDITS _____

APPLICABLE LEVEL(S): x 7-9 _____ 9-12 _____ Postsecondary Adult Vocational

_____ Postsecondary Vocational x Other 21

CERTIFICATION COVERAGE: INDUS ARTS 4 @ 6 WOODWORK 4 BLDG CONST @ 7
GEN SHOP @ 4 TEC CONSTR @ 7 CARPENTRY 7

I. MAJOR CONCEPTS/CONTENT: The purpose of this course is for students to explore the kinds and levels of work performed in construction industries. Laboratory experiences will allow students to explore the occupations, skills, and technologies of construction industries.

The content includes, but is not limited to, the exploratory study of construction industries, technologies, occupations, skills, safety, human relations, and leadership.

II. LABORATORY ACTIVITIES: Instruction and learning activities are provided in a laboratory setting using hands-on exploratory experiences with the tools and materials appropriate to the course content.

III. SPECIAL NOTE: The Florida American Industrial Arts Student Association is the appropriate student organization for providing leadership training experiences and for reinforcing specific vocational skills. When provided, these activities are considered an integral part of this instructional course.

IV. INTENDED OUTCOMES: After successfully completing this course, the student will be able to:

01. Identify kinds and levels of work common to construction industries.
02. Perform special skills unique to construction technology.
03. List requisites and career opportunities for employment in construction industries.
04. Display an understanding and appreciation for the dignity and worth of honest labor.
05. Express a knowledge of factors that impact on construction industries and practices.
06. Use proper and safe procedures in the construction laboratory.
07. Identify evolving technologies in construction industries.
08. Demonstrate computer literacy.
09. Demonstrate leadership and organizational skills.
10. Apply basic skills in English, mathematics, and science appropriate to technological content and learning activities.
11. Make an informed and meaningful occupational choice.

PROGRAM AREA: Industrial Arts SECONDARY NUMBER: 8600210

COURSE TITLE: Exploration of Construction Occupations

01.0 IDENTIFY KINDS AND LEVELS OF WORK COMMON TO CONSTRUCTION INDUSTRIES--The student will be able to:

01.01 Identify kinds of work related to construction technologies.
01.02 Identify semiskilled, skilled, and professional levels of work in construction industries.

02.0 PERFORM SPECIAL SKILLS UNIQUE TO CONSTRUCTION TECHNOLOGY--The student will be able to:

02.01 Interpret construction plans and blueprints.
02.02 Identify construction materials.
02.03 Apply carpentry skills.
02.04 Apply plumbing skills.
02.05 Apply electrical wiring skills.
02.06 Apply masonry skills.
02.07 Describe or demonstrate the construction skills of plastering, roofing and finishing.

03.0 LIST REQUISITES AND CAREER OPPORTUNITIES FOR EMPLOYMENT IN CONSTRUCTION INDUSTRIES--The student will be able to:

03.01 List occupations, job requirements, and employment opportunities in construction industries.
03.02 List occupational training programs and academic programs at the postsecondary levels in construction technologies.

04.0 DISPLAY AN UNDERSTANDING AND APPRECIATION FOR THE DIGNITY OF HONEST LABOR--The student will be able to:

04.01 Form an understanding and appreciation for work after listening to or observing construction industry workers.
04.02 Form an understanding and appreciation for work after participating in a simulated construction industry group project in the construction laboratory.
04.03 Form an understanding and appreciation for the roles and work of co-workers.

05.0 EXPRESS A KNOWLEDGE OF FACTORS THAT IMPACT ON CONSTRUCTION INDUSTRIES AND PRACTICES--The student will be able to:

05.01 Explain economic factors that impact on construction industries.
05.02 Research and identify types and styles of construction desired by consumers.
05.03 List sources of raw materials and standard stock materials available to the construction industry.
05.04 Express a knowledge of construction industry labor organizations and hiring practices.

06.0 USE PROPER AND SAFE PROCEDURES IN THE CONSTRUCTION LABORATORY--The student will be able to:

06.01 Follow lab safety rules and procedures.
06.02 Demonstrate good housekeeping at work station and within total lab.
06.03 Conduct lab activities and equipment operations in a safe manner.
06.04 Exercise care and respect for all tools, equipment, and materials.
06.05 Identify OSHA color coding safety standards.
06.06 Safely use hand tools and power equipment.
06.07 Explain fire prevention and extinguishing safety precautions and practices.

07.0 IDENTIFY EVOLVING TECHNOLOGIES IN CONSTRUCTION TECHNOLOGY INDUSTRIES--The student will be able to:

07.01 List evolving technologies in construction technology industries.
07.02 Report on a recent evolving technology in the construction industry.

08.0 DEMONSTRATE COMPUTER LITERACY--The student will be able to:

08.01 Define terms related to computer parts and usage.
08.02 List ways in which computers are used in construction technology.
08.03 Discuss advantages and disadvantages in the use of computers.

09.0 DEMONSTRATE LEADERSHIP AND ORGANIZATIONAL SKILLS--The student will be able to:

09.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
09.02 Identify employability skills required to hold a job in industry.
09.03 Work cooperatively with others.

10.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

10.01 Apply basic English skills while completing selected written and verbal technological assignments.
10.02 Apply basic mathematical skills while completing selected technological assignments.
10.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

11.0 MAKE AN INFORMED AND MEANINGFUL OCCUPATIONAL CHOICE--The student will be able to:

11.01 Make a tentative occupational choice based on the information learned and interest developed in this course.

CURRICULUM FRAMEWORK | PROGRAM AREA: Industrial Arts

FLORIDA DEPARTMENT OF EDUCATION | EFFECTIVE DATE: July, 1987

COURSE TITLE: Exploration of Graphic Communications Occupations

CODE NUMBER: Secondary 8600220 Postsecondary _____

Florida CIP 1A21.0116EX

SECONDARY SCHOOL CREDITS	COLLEGE CREDITS	POSTSECONDARY ADULT VOCATIONAL CREDITS
.5	_____	_____

APPLICABLE LEVEL(S): x 7-9 _____ 9-12 _____ Postsecondary Adult Vocational

_____ Postsecondary Vocational x Other 21

CERTIFICATION COVERAGE: INDUS ARTS 4 @ 6 GRAPHIC ARTS 4
GEN SHOP @ 4 PRINTING @ 4 7

I. MAJOR CONCEPTS/CONTENT: The purpose of this course is for students to explore the kinds and levels of work performed in graphic communications industries. Laboratory experiences will allow students to explore the occupations, skills, and technologies of the graphic communications industries.

The content includes, but is not limited to, the exploratory study of graphic communications industries, technologies, occupations, skills, safety, human relations, and leadership.

II. LABORATORY ACTIVITIES: Instruction and learning activities are provided in a laboratory setting using hands-on exploratory experiences with the tools and materials appropriate to the course content.

III. SPECIAL NOTE: The Florida American Industrial Arts Student Association is the appropriate student organization for providing leadership, training experiences and for reinforcing specific vocational skills. When provided, these activities are considered an integral part of this instructional course.

IV. INTENDED OUTCOMES: After successfully completing this course, the student will be able to:

01. Identify kinds and levels of work common to graphic communications industries.
02. Perform special skills unique to graphic communications technology.
03. List requisites and career opportunities for employment in graphic communications industries.
04. Display an understanding and appreciation for the dignity and worth of honest labor.
05. Express a knowledge of factors that impact on graphic communications industries and practices.
06. Use proper and safe procedures in the graphic communications laboratory.
07. Identify evolving technologies in graphic communications industries.
08. Demonstrate computer literacy.
09. Demonstrate leadership and organizational skills.
10. Apply basic skills in English, mathematics and science appropriate to technological content and learning activities.
11. Make an informed and meaningful occupational choice.

STUDENT PERFORMANCE STANDARDS EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts SECONDARY NUMBER: 8600220

COURSE TITLE: Exploration of Graphic Communications Occupations

01.0 IDENTIFY KINDS AND LEVELS OF WORK COMMON TO GRAPHIC COMMUNICATIONS INDUSTRIES--The student will be able to:

- 01.01 Identify kinds of work related to graphic communications technologies.
- 01.02 Identify semiskilled, skilled, and professional levels of work in graphic communications industries.

02.0 PERFORM SPECIAL SKILLS UNIQUE TO GRAPHIC COMMUNICATIONS TECHNOLOGY--The student will be able to:

- 02.01 Identify and use basic drafting tools and instruments for making drawings.
- 02.02 Use proper layout and design skills for producing a printed product.
- 02.03 Produce a product utilizing relief printing technology and skills.
- 02.04 Produce a product utilizing screen process printing technology and skills.
- 02.05 Produce a product utilizing lithographic printing technology and skills.
- 02.06 Produce a product utilizing gravure printing technology and skills.
- 02.07 Product a print utilizing photographic technology and skills.
- 02.08 Use bindery skills to produce a book or booklet.

03.0 LIST REQUISITES AND CAREER OPPORTUNITIES FOR EMPLOYMENT IN GRAPHIC COMMUNICATIONS INDUSTRIES--The student will be able to:

- 03.01 List occupations, job requirements, and employment opportunities in graphic communications industries.
- 03.02 List occupational training programs and academic programs at the postsecondary levels in graphic communications technologies.

04.0 DISPLAY AN UNDERSTANDING AND APPRECIATION FOR THE DIGNITY OF HONEST LABOR--The student will be able to:

- 04.01 Form an understanding and appreciation for work after listening to or observing graphic communications industry workers.
- 04.02 Form an understanding and appreciation for work after participating in graphic communications laboratory activities.
- 04.03 Form an understanding and appreciation for the roles and work of co-workers.

05.0 EXPRESS A KNOWLEDGE OF FACTORS THAT IMPACT ON GRAPHIC COMMUNICATIONS INDUSTRIES AND PRACTICES--The student will be able to:

- 05.01 Explain economic factors that impact on graphic communications industries.
- 05.02 Research and identify styles and types of printed products desired by customers or consumers.
- 05.03 Identify the natural and synthetic resources required for papers, inks, rollers, and solutions used in graphic communications industries.
- 05.04 Express a knowledge of graphic communications industry labor organizations and hiring practices.

06.0 USE PROPER AND SAFE PROCEDURES IN THE GRAPHIC COMMUNICATIONS LABORATORY--The student will be able to:

- 06.01 Follow lab safety rules and procedures.
- 06.02 Demonstrate good housekeeping at work station and within total lab.
- 06.03 Conduct lab activities and equipment operations in a safe manner.
- 06.04 Exercise care and respect for all tools, equipment, and materials.
- 06.05 Identify OSHA color coding safety standards.
- 06.06 Safely use hand tools and power equipment.
- 06.07 Explain fire prevention and extinguishing safety precautions and practices.

07.0 IDENTIFY EVOLVING TECHNOLOGIES IN GRAPHIC COMMUNICATIONS INDUSTRIES--The student will be able to:

- 07.01 List evolving technologies in graphic communications technology industries.
- 07.02 Report on a recent evolving technology in the graphic communications industry.

08.0 DEMONSTRATE COMPUTER LITERACY--The student will be able to:

- 08.01 Define terms related to computer parts and usage.
- 08.02 List ways in which computers are used in graphic communications technology.
- 08.03 Discuss advantages and disadvantages in the use of computers.

09.0 DEMONSTRATE LEADERSHIP AND ORGANIZATIONAL SKILLS--The student will be able to:

- 09.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 09.02 Identify employability skills required to hold a job in industry.
- 09.03 Work cooperatively with others.

10.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 10.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 10.02 Apply basic mathematical skills while completing selected technological assignments.
- 10.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

11.0 MAKE AN INFORMED AND MEANINGFUL OCCUPATIONAL CHOICE--The student will be able to:

- 11.01 Make a tentative occupational choice based on the information learned and interest developed in this course.

CURRICULUM FRAMEWORK PROGRAM AREA: Industrial Arts

FLORIDA DEPARTMENT OF EDUCATION EFFECTIVE DATE: July, 1987

COURSE TITLE: Exploration of Manufacturing Occupations

CODE NUMBER: Secondary 8600230 Postsecondary _____

Florida CIP 1A21.0117EX

SECONDARY SCHOOL CREDITS .5 COLLEGE CREDITS _____ POSTSECONDARY ADULT VOCATIONAL CREDITS _____

APPLICABLE LEVEL(S): x 7-9 _____ 9-12 _____ Postsecondary Adult Vocational

_____ Postsecondary Vocational x Other 21

CERTIFICATION COVERAGE: INDUS ARTS 4 @ 6 METALS 4
GEN SHOP @ 4 WOODWORK 4

I. MAJOR CONCEPTS/CONTENT: The purpose of this course is for students to explore the kinds and levels of work performed in manufacturing industries. Laboratory experiences will allow students to explore the occupations, skills, and technologies of the manufacturing industries.

The content includes, but is not limited to, the exploratory study of manufacturing industries, technologies, occupations, skills, safety, human relations, and leadership.

II. LABORATORY ACTIVITIES: Instruction and learning activities are provided in a laboratory setting using hands-on exploratory experiences with the tools and materials appropriate to the course content.

III. SPECIAL NOTE: The Florida American Industrial Arts Student Association is the appropriate student organization for providing leadership training experiences and for reinforcing specific vocational skills. When provided, these activities are considered an integral part of this instructional course.

IV. INTENDED OUTCOMES: After successfully completing this course, the student will be able to:

01. Identify kinds and levels of work common to manufacturing industries.
02. Perform special skills unique to manufacturing technology.
03. List requisites and career opportunities for employment in manufacturing industries.
04. Display an understanding and appreciation for the dignity and worth of honest labor.
05. Express a knowledge of factors that impact on manufacturing industries and practices.
06. Use proper and safe procedures in the manufacturing laboratory.
07. Identify evolving technologies in manufacturing industries.
08. Demonstrate computer literacy.
09. Demonstrate leadership and organizational skills.
10. Apply basic skills in English, mathematics and science appropriate to technological content and learning activities.
11. Make an informed and meaningful occupational choice.

STUDENT PERFORMANCE STANDARDS EFFECTIVE DATE: July 1987

PROGRAM AREA: Industrial Arts SECONDARY NUMBER: 8600230

COURSE TITLE: Exploration of Manufacturing Occupations

01.0 IDENTIFY KINDS AND LEVELS OF WORK COMMON TO MANUFACTURING INDUSTRIES--The student will be able to:

01.01 Identify kinds of work related to manufacturing technologies.
01.02 Identify semiskilled, skilled, and professional levels of work in manufacturing industries.

02.0 PERFORM SPECIAL SKILLS UNIQUE TO MANUFACTURING TECHNOLOGY--The student will be able to:

02.01 Design a product for custom or mass production manufacturing.
02.02 Plan a mass production system for manufacturing a product.
02.03 Perform materials forming practices such as casting or molding, and compressing or stretching.
02.04 Perform materials separating practices such as shearing, chip removing, and other separating processes.
02.05 Perform materials conditioning practices such as heat treating, physical conditioning, or through chemical reactions.
02.06 Combine components through mixing, coating, bonding, and mechanical fastening.
02.07 Assemble a product or a subassembly of a product.

03.0 LIST REQUISITES AND CAREER OPPORTUNITIES FOR EMPLOYMENT IN MANUFACTURING INDUSTRIES--The student will be able to:

03.01 List occupations, job requirements, and employment opportunities in manufacturing industries.
03.02 List occupational training programs and academic programs at the postsecondary levels in manufacturing technologies.

04.0 DISPLAY AN UNDERSTANDING AND APPRECIATION FOR THE DIGNITY OF HONEST LABOR--The student will be able to:

04.01 Form an understanding and appreciation for work after listening to or observing manufacturing industry workers.
04.02 Form an understanding and appreciation for work after participating in a simulated mass production manufacturing laboratory activity.
04.03 Form an understanding and appreciation for the roles and work of co-workers.

05.0 EXPRESS A KNOWLEDGE OF FACTORS THAT IMPACT ON MANUFACTURING INDUSTRIES AND PRACTICES--The student will be able to:

05.01 Explain economic factors that impact on manufacturing industries.
05.02 Research and identify consumer demands for a manufactured product.
05.03 Identify sources of raw materials and/or standard stock materials needed for a manufactured product.
05.04 Interview, hire, train, or promote an applicant or employee for a simulated mass production manufacturing activity.
05.05 Define the terms "organized labor" and "collective bargaining."
05.06 Prepare a plan for marketing and distributing a manufactured product.

06.0 USE PROPER AND SAFE PROCEDURES IN THE MANUFACTURING LABORATORY--The student will be able to:

06.01 Follow lab safety rules and procedures.
06.02 Demonstrate good housekeeping at work station and within total lab.
06.03 Conduct lab activities and equipment operations in a safe manner.
06.04 Exercise care and respect for all tools, equipment, and materials.
06.05 Identify OSHA color coding safety standards.
06.06 Safely use hand tools and power equipment.
06.07 Explain fire prevention and extinguishing safety precautions and practices.

07.0 IDENTIFY EVOLVING TECHNOLOGIES IN MANUFACTURING INDUSTRIES--The student will be able to:

07.01 List evolving technologies in manufacturing technology industries.
07.02 Report on a recent evolving technology in the manufacturing industry.

08.0 DEMONSTRATE COMPUTER LITERACY--The student will be able to:

- 08.01 Define terms related to computer parts and usage.
- 08.02 List ways in which computers are used in manufacturing technology.
- 08.03 Discuss advantages and disadvantages in the use of computers.

09.0 DEMONSTRATE LEADERSHIP AND ORGANIZATIONAL SKILLS--The student will be able to:

- 09.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 09.02 Identify employability skills required to hold a job in industry.
- 09.03 Work cooperatively with others.

10.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 10.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 10.02 Apply basic mathematical skills while completing selected technological assignments.
- 10.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

11.0 MAKE AN INFORMED AND MEANINGFUL OCCUPATIONAL CHOICE--The student will be able to:

- 11.01 Make a tentative occupational choice based on the information learned and interest developed in this course.

CURRICULUM FRAMEWORK PROGRAM AREA: Industrial Arts

FLORIDA DEPARTMENT OF EDUCATION EFFECTIVE DATE: July, 1987

COURSE TITLE: Exploration of Power and Transportation Occupations

CODE NUMBER: Secondary 8600240 Postsecondary _____

Florida CIP IA21.0115EX

SECONDARY SCHOOL CREDITS .5 COLLEGE CREDITS _____ POSTSECONDARY ADULT VOCATIONAL CREDITS _____

APPLICABLE LEVEL(S): x 7-9 _____ 9-12 _____ Postsecondary Adult Vocational

_____ Postsecondary Vocational x Other 21

CERTIFICATION COVERAGE: INDUS ARTS 4 @ 6 TRANSPORT 4 AUTO MECH 7
GEN SHOP @ 4 GAS ENG RPR 7

I. MAJOR CONCEPTS/CONTENT: The purpose of this course is for students to explore the kinds and levels of work performed in power and transportation industries. Laboratory experiences will allow student to explore the occupations, skills, and technologies of power and transportation industries.

The content includes, but is not limited to, the exploratory study of power and transportation industries, technologies, occupations, skills, safety, human relations, and leadership.

II. LABORATORY ACTIVITIES: Instruction and learning activities are provided in a laboratory setting using hands-on exploratory experiences with the tools and materials appropriate to the course content.

III. SPECIAL NOTE: The Florida American Industrial Arts Student Association is the appropriate student organization for providing leadership training experiences and for reinforcing specific vocational skills. When provided, these activities are considered an integral part of this instructional course.

IV. INTENDED OUTCOMES: After successfully completing this course, the student will be able to:

01. Identify kinds and levels of work common to the power and transportation industries.
02. Perform special skills unique to power and transportation technologies.
03. List requisites and career opportunities for employment in power and transportation industries.
04. Display an understanding and appreciation for the dignity and worth of honest labor.
05. Express a knowledge of the industries that deal with power and transportation technology.
06. Use proper and safe procedures in the power and transportation laboratory.
07. Identify evolving technologies in power and transportation industries.
08. Demonstrate computer literacy.
09. Demonstrate leadership and organizational skills.
10. Apply basic skills in English, mathematics, and science appropriate to technological content and learning activities.
11. Make an informed and meaningful occupational choice.

STUDENT PERFORMANCE STANDARDS EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts SECONDARY NUMBER: 8600240

COURSE TITLE: Exploration of Power and Transportation Occupations

01.0 IDENTIFY KINDS AND LEVELS OF WORK COMMON TO POWER AND TRANSPORTATION INDUSTRIES--The student will be able to:

01.01 Identify kinds of work related to power technologies.
01.02 Identify kinds of work related to transportation technologies.
01.03 Identify semiskilled, skilled, and professional levels of work in power and transportation industries.

02.0 PERFORM SPECIAL SKILLS UNIQUE TO POWER AND TRANSPORTATION TECHNOLOGIES--The student will be able to:

02.01 Disassemble and reassemble or perform maintenance on a muscle powered bicycle.
02.02 Disassemble and reassemble or perform maintenance on a pneumatic or hydraulic device.
02.03 Disassemble and reassemble or perform maintenance on an internal combustion engine.
02.04 Disassemble and reassemble or perform maintenance on an electrical motor, generator, or alternator.
02.05 Construct, maintain, or repair a land, water, or air/space vehicle.
02.06 Construct a water powered, wind powered, steam powered, thermal powered, or solar powered device.

03.0 LIST REQUISITES AND CAREER OPPORTUNITIES FOR EMPLOYMENT IN POWER AND TRANSPORTATION INDUSTRIES--The student will be able to:

03.01 List occupations, job requirements, and employment opportunities in power technology industries.
03.02 List occupations and employment opportunities in transportation technology industries.
03.03 List occupational training programs and academic programs available at the postsecondary levels in power and in transportation technologies.

04.0 DISPLAY AN UNDERSTANDING AND APPRECIATION FOR THE DIGNITY AND WORTH OF HONEST LABOR--The student will be able to:

04.01 Form an understanding and appreciation for work after listening to or observing power and transportation industrial workers.
04.02 Form an understanding and appreciation for work after performing simulated industrial work in the power and transportation laboratory.
04.03 Form an understanding and appreciation for the roles and work of co-workers.

05.0 EXPRESS A KNOWLEDGE OF THE INDUSTRIES THAT DEAL WITH POWER AND TRANSPORTATION TECHNOLOGY--The student will be able to:

05.01 Identify the industries that supply or control energy sources.
05.02 Identify industries that produce power systems.
05.03 Describe power and energy applications in transportation industries.
05.04 List transportation systems produced or used by industries.

06.0 USE PROPER AND SAFE PROCEDURES IN THE POWER AND TRANSPORTATION LABORATORY--The student will be able to:

06.01 Follow lab safety rules and procedures.
06.02 Demonstrate good housekeeping at work station and within total lab.
06.03 Conduct lab activities and equipment operations in a safe manner.
06.04 Exercise care and respect for all tools, equipment, and materials.
06.05 Identify OSHA color coding safety standards.
06.06 Safely use hand tools and power equipment.
06.07 Explain fire prevention and extinguishing safety precautions and practices.

07.0 IDENTIFY EVOLVING TECHNOLOGIES IN POWER AND TRANSPORTATION INDUSTRIES--The student will be able to:

07.01 List evolving technologies in power technology industries.
07.02 List evolving technologies in transportation technology industries.
07.03 Report on a recent evolving technology in the power and transportation industry.

08.0 DEMONSTRATE COMPUTER LITERACY--The student will be able to:

08.01 Define terms related to computer parts and usage.
08.02 List ways in which computers are used in power and transportation technology.
08.03 Discuss advantages and disadvantages in the use of computers.

09.0 DEMONSTRATE LEADERSHIP AND ORGANIZATIONAL SKILLS--The student will be able to:

09.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
09.02 Identify employability skills required to hold a job in industry.
09.03 Work cooperatively with others.

10.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

10.01 Apply basic English skills while completing selected written and verbal technological assignments.
10.02 Apply basic mathematical skills while completing selected technological assignments.
10.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

11.0 MAKE AN INFORMED AND MEANINGFUL OCCUPATIONAL CHOICE--The student will be able to:

11.01 Make a tentative occupational choice based on the information learned and interest developed in this course.

CURRICULUM FRAMEWORK PROGRAM AREA: Industrial Arts

FLORIDA DEPARTMENT OF EDUCATION EFFECTIVE DATE: July, 1987

COURSE TITLE: Practical Graphic Communications

CODE NUMBER: Secondary 8600310 Postsecondary _____

Florida CIP IA21.0124PA

SECONDARY SCHOOL CREDITS	COLLEGE CREDITS	POSTSECONDARY ADULT VOCATIONAL CREDITS
.5	_____	_____

APPLICABLE LEVEL(S): _____7-9 x 9-12 _____Postsecondary Adult Vocational

_____ Postsecondary Vocational x Other 21

CERTIFICATION COVERAGE: INDUS ARTS 4 @ 6 GRAPHIC ARTS 4
GEN SHOP @ 4

I. MAJOR CONCEPTS/CONTENT: This course is designed to provide students with a practical foundation of knowledge and skills concerning graphic communications technology.

The content includes, but is not limited to, the general study and application of technology related to drafting, layout and design, printing, copying, materials, safety, and leadership.

II. LABORATORY ACTIVITIES: Learning activities are provided in a laboratory setting using hands-on experiences with the tools and materials appropriate to the course content.

III. SPECIAL NOTE: The Florida American Industrial Arts Student Association is the appropriate student organization for providing leadership training experiences and for reinforcing specific vocational skills. When provided, the activities are considered an integral part of this instructional course.

IV. INTENDED OUTCOMES: After successfully completing this course the student will be able to:

01. Demonstrate a practical technological literacy about graphic communications.
02. Demonstrate computer literacy and application.
03. Apply practical graphic communications technology skills.
04. Use proper and safe procedures in the graphic communications technology laboratory.
05. Apply basic skills in English, mathematics, and science appropriate to technological content and learning activities.
06. Exhibit positive human relations and leadership skills.

STUDENT PERFORMANCE STANDARDS EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts SECONDARY NUMBER: 8600310

COURSE TITLE: Practical Graphic Communications

01.0 DEMONSTRATE A PRACTICAL TECHNOLOGICAL LITERACY ABOUT GRAPHIC COMMUNICATIONS--The student will be able to:

01.01 Outline major technological developments and events in the history of graphic communications.
01.02 Identify recent advances in graphic communications technology.
01.03 Explain the problem solving roles of graphic communications technology in an American and world society.
01.04 Forecast a development or event in graphic communications technology.
01.05 Make a technological decision related to graphic communications.
01.06 Define graphic communications technology.

02.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

02.01 Define terms related to computer parts and usage.
02.02 List ways in which computers are used in graphic communications technology.
02.03 Discuss advantages and disadvantages in the use of computers.
02.04 Demonstrate the application of a computer.

03.0 APPLY PRACTICAL GRAPHIC COMMUNICATIONS TECHNOLOGY SKILLS--The student will be able to:

03.01 Identify the basic tools and instruments for drafting.
03.02 Interpret a blueprint, working drawing or other type of dimensioned technical illustration.
03.03 Produce a working drawing or technical illustration using drafting tools, instruments, and skills.
03.04 Sketch, draw, or paste-up a dummy for printing reproduction using the proper principles of graphic arts layout and design.
03.05 Explain the distinguishing features of families and styles of type.
03.06 Identify and perform the processes of relief, gravure, lithographic, and screen printing.
03.07 Design, layout, and produce a printed product utilizing the tools, equipment, materials and processes of one or more of the above printing processes.
03.08 Express a knowledge of the basic theory photography.
03.09 Produce a photographic negative and print utilizing the tools, equipment, materials and processes of photography.
03.10 Produce printed material through word processing and electrostatic copying.
03.11 Describe the basic characteristics and specifications of paper, ink, and chemicals used in graphic communications technology.
03.12 List ways in which computers are used in graphic communications technology.
03.13 Operate a computer utilizing a program related to graphic communications technology.

04.0 USE PROPER AND SAFE PROCEDURES IN THE GRAPHIC COMMUNICATIONS TECHNOLOGY LABORATORY--The student will be able to:

04.01 Follow laboratory safety rules and procedures.
04.02 Demonstrate good housekeeping at work station and within total laboratory environment.
04.03 Conduct tool and machine operations in a safe manner.
04.04 Exercise care and respect for all tools, equipment and materials.
04.05 Identify OSHA color coding safety standards.
04.06 Safely use hand tools and power equipment.
04.07 Explain fire prevention and extinguishing safety precautions and practices.

05.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

05.01 Apply basic English skills while completing selected written and verbal technological assignments.
05.02 Apply basic mathematical skills while completing selected technological assignments.

05.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

06.0 EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

06.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
06.02 Identify employability skills required to hold a job in industry.
06.03 Work cooperatively with others.

CURRICULUM FRAMEWORK PROGRAM AREA: Industrial Arts

FLORIDA DEPARTMENT OF EDUCATION EFFECTIVE DATE: July, 1987

COURSE TITLE: Practical Home Mechanics

CODE NUMBER: Secondary 8600320 Postsecondary _____

Florida CIP IA21.0122PA

SECONDARY SCHOOL CREDITS .5 COLLEGE CREDITS _____ POSTSECONDARY ADULT VOCATIONAL CREDITS _____

APPLICABLE LEVEL(S): _____7-9 x 9-12 _____Postsecondary Adult Vocational

_____ Postsecondary Vocational x Other 21

CERTIFICATION COVERAGE: INDUS ARTS 4 @ 6
GEN SHOP @ 4

I. MAJOR CONCEPTS/CONTENT: This course is designed to provide students with a practical foundation of knowledge and skills concerning home mechanics.

The content includes, but is not limited to, the general study and application of home mechanics related to the electrical, plumbing, and structural systems in a home, finishing methods, sanitation, repairs, safety, and leadership.

II. LABORATORY ACTIVITIES: Learning activities are provided in a laboratory setting using hands-on experiences with the tools and materials appropriate to the course content.

III. SPECIAL NOTE: The Florida American Industrial Arts Student Association is the appropriate student organization for providing leadership training experiences and for reinforcing specific vocational skills. When provided, the activities are considered an integral part of this instructional course.

IV. INTENDED OUTCOMES: After successfully completing this course, the student will be able to:

01. Demonstrate a practical technological literacy about home mechanics.
02. Demonstrate computer literacy and application.
03. Apply practical home mechanics technology skills.
04. Use proper and safe procedures in the home mechanics technology laboratory
05. Apply basic skills in English, mathematics, and science appropriate to technological content and learning activities.
06. Exhibit positive human relations and leadership skills.

PROGRAM AREA: Industrial Arts SECONDARY NUMBER: 8600320

COURSE TITLE: Practical Home Mechanics

01.0 DEMONSTRATE A PRACTICAL TECHNOLOGICAL LITERACY ABOUT HOME MECHANICS--The student will be able to:

- 01.01 Outline major technological developments and events that have enhanced do-it-yourself home maintenance practices.
- 01.02 Identify recent advances in home mechanics technology.
- 01.03 Demonstrate a knowledge of problem solving approaches to handle home maintenance needs.
- 01.04 Forecast a development or event in home mechanics technology or practices.
- 01.05 Make a technological decision related to home mechanics.
- 01.06 Define home mechanics.

02.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 02.01 Define terms related to computer parts and usage.
- 02.02 List ways in which computers are used in home mechanics technology.
- 02.03 Discuss advantages and disadvantages in the use of computers.
- 02.04 Demonstrate the application of a computer.

03.0 APPLY PRACTICAL HOME MECHANICS SKILLS--The student will be able to:

- 03.01 Identify and use common tools, materials, and equipment for home maintenance and repairs.
- 03.02 Perform plumbing maintenance on pipes, faucets, flush tanks, drains, traps, and sewer systems.
- 03.03 Perform wall, floor, and ceiling maintenance.
- 03.04 Perform roof maintenance and repairs.
- 03.05 Perform window and door maintenance and repairs.
- 03.06 Mix and use mortar or concrete to regrout tile or repoint brickwork.
- 03.07 Prepare a home surface for finishing and apply the finish.
- 03.08 Make basic home electrical repairs.
- 03.09 Draw a layout for a home workshop with a suggested list of tools, machines, and materials.
- 03.10 Develop a schedule of routine preventative home maintenance practices.
- 03.11 Demonstrate technical consumer knowledge about home mechanics tools, materials, and machines.
- 03.12 List ways in which a personal computer may be used for home mechanics purposes.
- 03.13 Operate a computer utilizing a program related to home mechanics.

04.0 USE PROPER AND SAFE PROCEDURES IN THE HOME MECHANICS TECHNOLOGY LABORATORY--The student will be able to:

- 04.01 Follow laboratory safety rules and procedures.
- 04.02 Demonstrate good housekeeping at work station and within total laboratory environment.
- 04.03 Conduct tool and machine operations in a safe manner.
- 04.04 Exercise care and respect for all tools, equipment and materials.
- 04.05 Identify OSHA color coding safety standards.
- 04.06 Safely use hand tools and power equipment.
- 04.07 Explain fire prevention and extinguishing safety precautions and practices.

05.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 05.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 05.02 Apply basic mathematical skills while completing selected technological assignments.
- 05.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

06.0 EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 06.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 06.02 Identify employability skills required to hold a job in industry.
- 06.03 Work cooperatively with others.

CURRICULUM FRAMEWORK PROGRAM AREA: Industrial Arts

FLORIDA DEPARTMENT OF EDUCATION EFFECTIVE DATE: July, 1987

COURSE TITLE: Practical Power Mechanics and Energy

CODE NUMBER: Secondary 8600340 Postsecondary _____

Florida CIP IA21.0123PA

SECONDARY SCHOOL CREDITS .5 COLLEGE CREDITS _____ POSTSECONDARY ADULT VOCATIONAL CREDITS _____

APPLICABLE LEVEL(S): _____ 7-9 x 9-12 _____ Postsecondary Adult Vocational

_____ Postsecondary Vocational x Other 21

CERTIFICATION COVERAGE: INDUS ARTS 4 @ 6 TRANSPORT 4
GEN SHOP @ 4

I. MAJOR CONCEPTS/CONTENT: This course is designed to provide students with a practical foundation of knowledge and skills concerning power mechanics and energy technology.

The content includes, but is not limited to, the general study and applications of technology related to energy sources, conversion of energy to power, the control and transmission of power, safety, and leadership.

II. LABORATORY ACTIVITIES: Learning activities are provided in a laboratory setting using hands-on experiences with the tools, materials, and devices appropriate to the course content.

III. SPECIAL NOTE: The Florida American Industrial Arts Student Association is the appropriate student organization for providing leadership training experiences and for reinforcing specific vocational skills. When provided, these activities are considered an integral part of this instructional course.

IV. INTENDED OUTCOMES: After successfully completing this course, the student will be able to:

01. Demonstrate a practical technological literacy about power mechanics and energy.
02. Demonstrate computer literacy and application.
03. Apply practical power mechanics and energy technology skills.
04. Use proper and safe procedures in the power mechanics and energy technology laboratory.
05. Apply basic skills in English, mathematics, and science appropriate to technological content and learning activities.
06. Exhibit positive human relations and leadership skills.

STUDENT PERFORMANCE STANDARDS EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts SECONDARY NUMBER: 8600340

COURSE TITLE: Practical Power Mechanics and Energy

01.0 DEMONSTRATE A PRACTICAL TECHNOLOGICAL LITERACY ABOUT POWER MECHANICS AND ENERGY--The student will be able to:

- 01.01 Outline major technological developments and events in the history of power mechanics and energy.
- 01.02 Identify recent advances in power mechanics and energy technology.
- 01.03 Explain the problem solving roles of power mechanics and energy technology in an American and world society.
- 01.04 Forecast a development or event in power mechanics and energy technology.
- 01.05 Make a technological decision related to power mechanics and energy.
- 01.06 Define power mechanics and energy technology.

02.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 02.01 Define terms related to computer parts and usage.
- 02.02 List ways in which computers are used in power mechanics and energy technology.
- 02.03 Discuss advantages and disadvantages in the use of computers.
- 02.04 Demonstrate the application of a computer.

03.0 APPLY PRACTICAL POWER MECHANICS AND ENERGY TECHNOLOGY SKILLS--The student will be able to:

- 03.01 Explain the sources of nuclear, solar, wind, water, thermal, and burning fuel energy.
- 03.02 Research and demonstrate the conversion of an energy source to power.
- 03.03 Demonstrate the mechanical input, control, transmission, and output of power through the use of gears, pulleys, shafts, wheels, axles, levers, screws, and inclined planes.
- 03.05 Apply the pneumatic and hydraulic transmission of power.
- 03.06 Describe the technology and technical operation of steam, gasoline, diesel, jet, and rocket engines.
- 03.07 Report on the technological uses of wind, thermal, water, solar, and nuclear powered devices and vehicles.
- 03.08 Incorporate the use of a generator, alternator, or turbine in the transmission of electrical power to operate a device or to produce light.
- 03.09 Measure consumption of a selected energy use.
- 03.10 List the basic principles of energy conservation.
- 03.11 Troubleshoot and perform routine maintenance or repairs on any one of the engines listed in 02.06.
- 03.12 List ways in which computers are used in power mechanics and energy technology.
- 03.13 Operate a computer utilizing a program related to power mechanics and energy technology.

04.0 USE PROPER AND SAFE PROCEDURES IN THE POWER MECHANICS AND ENERGY TECHNOLOGY LABORATORY--The student will be able to:

- 04.01 Follow lab safety rules and procedures.
- 04.02 Demonstrate good housekeeping at work station and within total lab.
- 04.03 Conduct lab activities and equipment operations in a safe manner.
- 04.04 Exercise care and respect for all tools, equipment, and materials.
- 04.05 Identify OSHA color coding safety standards.
- 04.06 Safely use hand tools and power equipment.
- 04.07 Explain fire prevention and extinguishing safety precautions and practices.

05.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 05.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 05.02 Apply basic mathematical skills while completing selected technological assignments.
- 05.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

06.0 EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

06.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
06.02 Identify employability skills required to hold a job in industry.
06.03 Work cooperatively with others.

CURRICULUM FRAMEWORK PROGRAM AREA: Industrial Arts

FLORIDA DEPARTMENT OF EDUCATION EFFECTIVE DATE: July, 1987

COURSE TITLE: Practical Industrial Skills

CODE NUMBER: Secondary 8600330 Postsecondary _____

Florida CIP IA21.0121PA

SECONDARY SCHOOL CREDITS	COLLEGE CREDITS	POSTSECONDARY ADULT VOCATIONAL CREDITS
.5	_____	_____

APPLICABLE LEVEL(S): _____ 7-9 x 9-12 _____ Postsecondary Adult Vocational

_____ Postsecondary Vocational x Other 21

CERTIFICATION COVERAGE: INDUS ARTS 4 @ 6, GEN SHOP @ 4, GRAPH ARTS 4, WOOD WORK 4, METALS 4, ELECTRICAL 4, TRANSPORT 4

I. MAJOR CONCEPTS/CONTENT: This course is designed to provide students with a practical foundation of knowledge and skills concerning industrial tools, materials, and processes.

The content includes, but is not limited to, the general study and application of common industrial tool skills, materials, processes, safety and leadership.

II. LABORATORY ACTIVITIES: Learning activities are provided in a laboratory setting using hands-on experiences with the tools, machines and materials appropriate to the selected course content.

III. SPECIAL NOTE: The Florida American Industrial Arts Student Association is the appropriate student organization for providing leadership training experiences and for reinforcing specific vocational skills. When provided, these activities are considered an integral part of this instructional course.

IV. INTENDED OUTCOMES: After successfully completing this course, the student will be able to:

01. Demonstrate a practical technological literacy about industrial skills.
02. Demonstrate computer literacy and application.
03. Apply practical industrial skills.
04. Use proper and safe procedures in the industrial skills laboratory.
05. Apply basic skills in English, mathematics, and science appropriate to technological content and learning activities.
06. Exhibit positive human relations and leadership skills.

STUDENT PERFORMANCE STANDARDS EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts SECONDARY NUMBER: 860035

COURSE TITLE: Practical Industrial Skills

01.0 DEMONSTRATE A PRACTICAL TECHNOLOGICAL LITERACY ABOUT INDUSTRIAL SKILLS--The student will be able to:

- 01.01 Outline major technological developments and events in the history of industrial skills.
- 01.02 Identify recent advances in industrial skills technology and practices.
- 01.03 Explain the problem solving roles of industrial skills in an American technological society.
- 01.04 Forecast a development or event in industrial skills technology.
- 01.05 Make a technological decision related to industrial skills.
- 01.06 Define industrial skills.

02.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 02.01 Define terms related to computer parts and usage.
- 02.02 List ways in which computers are used in industrial skills technology.
- 02.03 Discuss advantages and disadvantages in the use of computers.
- 02.04 Demonstrate the application of a computer.

03.0 APPLY PRACTICAL INDUSTRIAL SKILLS--The student will be able to:

- 03.01 Sketch, draw, and interpret working drawings.
- 03.02 Research and report on the properties of woods, metals, plastics, and composite industrial materials.
- 03.03 Design and construct one or more individual projects utilizing the materials, technical industrial skills and processes of woods, metals, and plastics technology.
- 03.04 Use measuring tools and instruments.
- 03.05 Participate in a small or large group to analyze and solve a problem utilizing practical industrial skills.
- 03.06 Apply a practical knowledge of the special finishing requirements and techniques for woods, metals, and plastics.
- 03.07 Apply a practical knowledge of the special bonding and fastening materials and techniques for woods, metals, and plastics.
- 03.08 Recognize and list several commercial products made of woods, metals, and plastics.
- 03.09 Identify or observe a variety of industrial skills applied in the local community.
- 03.10. Estimate the cost of a job requiring industrial skills, materials, and processes.
- 03.11 List groups or organizations that represent specialized industrial skills.
- 02.12 List ways in which computers are used in the application of industrial skills.
- 03.13 Operate a computer utilizing a program related to an industrial skill.

04.0 USE PROPER AND SAFE PROCEDURES IN THE INDUSTRIAL SKILLS LABORATORY--The student will be able to:

- 04.01 Follow lab safety rules and procedures.
- 04.02 Demonstrate good housekeeping at work station and within total lab.
- 04.03 Conduct lab activities and equipment operations in a safe manner.
- 04.04 Exercise care and respect for all tools, equipment, and materials.
- 04.05 Identify OSHA color coding safety standards.
- 04.06 Safely use hand tools and power equipment.
- 04.07 Explain fire prevention and extinguishing safety precautions and practices.

05.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 05.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 05.02 Apply basic mathematical skills while completing selected technological assignments.
- 05.03 Apply basic science principles, theories, laws and procedures while completing selected technological assignments.

06.0 EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

06.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
06.02 Identify employability skills required to hold a job in industry.
06.03 Work cooperatively with others.

CURRICULUM FRAMEWORK PROGRAM AREA: Industrial Arts

FLORIDA DEPARTMENT OF EDUCATION EFFECTIVE DATE: July, 1987

COURSE TITLE: Practical Industrial Systems

CODE NUMBER: Secondary 8600350 Postsecondary _____

Florida CIP IA21.0125PA

SECONDARY SCHOOL CREDITS .5 COLLEGE CREDITS _____ POSTSECONDARY ADULT VOCATIONAL CREDITS _____

APPLICABLE LEVEL(S): _____7-9 x 9-12 _____Postsecondary Adult Vocational

_____ Postsecondary Vocational x Other 21

CERTIFICATION COVERAGE: INDUS ARTS 4 @ 6 GEN SHOP @ 4
GRAPH ARTS 4 TRANSPORT 4
WOOD WORK 4 METALS 4
ELECTRICAL 4

I. MAJOR CONCEPTS/CONTENT: This course is designed to provide students with a practical foundation of knowledge and skills concerning industrial systems technology.

The content includes, but is not limited to, the general study and state-of-the-art applications of the computer as a control device for mechanical, electrical, and fluidic systems. Content will also include the opportunity to develop safety and leadership skills in industrial technology.

II. LABORATORY ACTIVITIES: Learning activities are provided in a laboratory setting using hands-on experiences with the tools and materials appropriate to the course content.

III. SPECIAL NOTE: The Florida American Industrial Arts Student Association is the appropriate student organization for providing leadership training experiences and for reinforcing specific vocational skills. When provided, these activities are considered an integral part of this instructional course.

IV. INTENDED OUTCOMES: After successfully completing this course, the student will be able to:

01. Demonstrate a practical technological literacy about industrial systems.
02. Demonstrate computer literacy and application.
03. Apply practical industrial systems technology skills.
04. Use proper and safe procedures in the industrial systems technology laboratory.
05. Apply basic skills in English, mathematics, and science appropriate to technological content and learning activities.
06. Exhibit positive human relations and leadership skills.

STUDENT PERFORMANCE STANDARDS EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts SECONDARY NUMBER: 8600350

COURSE TITLE: Practical Industrial Systems

01.0 DEMONSTRATE A PRACTICAL TECHNOLOGICAL LITERACY ABOUT INDUSTRIAL SYSTEMS--The student will be able to:

01.01 Outline major historical technological developments or events.
01.02 Identify recent advances in technology.
01.03 Explain problem solving roles of technology.
01.04 Forecast a technological development or event.
01.05 Make a technological decision.
01.06 Define technology.

02.0 DEMONSTRATE COMPUTER LITERACY--The student will be able to:

02.01 Define terms related to computer parts and usage.
02.02 List ways in which computers are used in industrial systems technology.
02.03 Discuss advantages and disadvantages in the use of computers.
02.04 Demonstrate the application of a computer.

03.0 APPLY PRACTICAL INDUSTRIAL SYSTEMS TECHNOLOGY SKILLS--The student will be able to:

03.01 List ways in which computers are used in the control of industrial technology systems.
03.02 Diagram an industrial technological system incorporating input, monitoring, controlling, output, and feedback components.
03.03 Assemble, operate, and identify the parts of a system which demonstrates basic mechanical principles.
03.04 Assemble, operate, and identify the parts of a system which demonstrates basic electrical principles.
03.05 Assemble, operate, and identify the parts of a system which demonstrates basic fluidic principles.
03.06 Demonstrate the use of a computer to interface with and control a mechanical device.
03.07 Demonstrate the use of a computer to interface with and control an electrical device.
03.08 Demonstrate the use of a computer to interface with and control a fluidic device.
03.09 Demonstrate the use of a computer to control an integrated system composed of elements of mechanical, electrical, or fluidic systems.
03.10 Operate a robot.
03.11 Define CNC, CAM, and CIM.

04.0 USE PROPER AND SAFE PROCEDURES IN THE INDUSTRIAL SYSTEMS TECHNOLOGY LABORATORY--The student will be able to:

04.01 Follow lab safety rules and procedures.
04.02 Demonstrate good housekeeping at work station and within total lab.
04.03 Conduct lab activities and equipment operations in a safe manner.
04.04 Exercise care and respect for all tools, equipment, and materials.
04.05 Identify OSHA color coding safety standards.
04.06 Safely use hand tools and power equipment.
04.07 Explain fire prevention and extinguishing safety precautions and practices.

05.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

05.01 Apply basic English skills while completing selected written and verbal technological assignments.
05.02 Apply basic mathematical skills while completing selected technological assignments.
05.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

06.0 EXHIBIT POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

06.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
06.02 Identify employability skills required to hold a job in industry.
06.03 Work cooperatively with others.

CURRICULUM FRAMEWORK — PROGRAM AREA: Industrial Arts

FLORIDA DEPARTMENT OF EDUCATION — EFFECTIVE DATE: July, 1987

PROGRAM TITLE: Pretechnical Construction

CODE NUMBER: Secondary 8600700 — Postsecondary _____

Florida CIP IA21.010200

SECONDARY SCHOOL CREDITS	COLLEGE CREDITS	POSTSECONDARY ADULT VOCATIONAL CREDITS
3	_____	_____

APPLICABLE LEVEL(S): _____ 7-9 x 9-12 _____ Postsecondary Adult Vocational

_____ Postsecondary Vocational x Other 21

CERTIFICATION COVERAGE: INDUS ARTS 4 @ 6; GEN SHOP @ 4; CARPENTRY 7; WOODWORK 4; TEC CONSTR @ 7; BLDG CONSTR @ 7

I. MAJOR CONCEPTS/CONTENT: The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of construction technology.

The content includes, but is not limited to, a study of the tools, materials, processes, and technical skills of construction technology. The content and activities will also include the study of entrepreneurship, safety, and leadership skills.

Listed below are the courses that comprise this program at the secondary level:

8600710 Introduction to Construction
8600720 Intermediate Construction
8600730 Construction - Individual Study

II. LABORATORY ACTIVITIES: Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the tools and materials appropriate to the course content.

III. SPECIAL NOTE: The Florida American Industrial Arts Student Association is the appropriate vocational student organization for providing leadership training experiences and for reinforcing specific vocational skills. When provided, these activities are considered an integral part of this instructional program.

IV. INTENDED OUTCOMES: After successfully completing this program, the student will be able to:

01. Use proper and safe procedures in the construction technology laboratory.
02. Demonstrate positive human relations and leadership skills.
03. Apply basic skills in English, mathematics, and science appropriate to technological content and learning activities.
04. Demonstrate computer literacy and application.
05. Demonstrate an understanding of entrepreneurship.
06. Demonstrate basic technical knowledge and skills about construction technology.
07. Apply advanced technical knowledge and skills about construction technology.
08. Demonstrate technical knowledge and skills about selecting and preparing a construction site.
09. Demonstrate technical knowledge and skills about designing and engineering constructed works.
10. Demonstrate technical knowledge and skills about contracting, estimating, bidding, and scheduling.
11. Demonstrate technical knowledge and skills about constructing substructures.
12. Demonstrate technical knowledge and skills about constructing superstructures.
13. Demonstrate technical knowledge and skills about installing utilities.

14. Demonstrate technical knowledge and skills about enclosing superstructures.
15. Demonstrate technical knowledge and skills about interior and exterior finishing of a constructed structure.
16. Perform advanced study and technical skills related to construction technology.
17. Operate a computer utilizing a program related to construction technology.
18. Demonstrate technical knowledge and skills about regional planning and the construction of civil or community structures.
19. Conduct structural tests on constructed structures and construction materials.
20. Conduct a research and experimentation project on a construction technology process or material.

STUDENT PERFORMANCE STANDARDS EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts SECONDARY NUMBER: 8600700

PROGRAM TITLE: Pretechnical Construction

01.0 USE PROPER AND SAFE PROCEDURES IN THE CONSTRUCTION TECHNOLOGY LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safety standards.
- 01.06 Safely use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 02.02 Participate as an effective team member.
- 02.03 Follow oral and written instructions.
- 02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 03.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 03.02 Apply basic mathematical skills while completing selected technological assignments.
- 03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 04.01 Define terms related to computer parts and usage.
- 04.02 List ways in which computers are used in construction technology.
- 04.03 Discuss advantages and disadvantages in the use of computers.
- 04.04 Demonstrate the application of a computer.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 05.01 Define entrepreneurship.
- 05.02 Describe the importance of entrepreneurship to the American economy.
- 05.03 List the advantages and disadvantages of business ownership.
- 05.04 Identify the risks involved in ownership of a business.
- 05.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 05.06 Identify the business skills needed to operate a small business efficiently and effectively.

06.0 DEMONSTRATE BASIC TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTION TECHNOLOGY--The student will be able to:

- 06.01 Demonstrate basic technical knowledge and skills about student performance standards 08.01 through 15.04.
- 06.02 Demonstrate basic technical knowledge and skills in the construction of a structure.

07.0 APPLY ADVANCED TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTION TECHNOLOGY--The student will be able to:

- 07.01 Apply advanced technical knowledge and skills about student performance standards 08.01 through 15.04.
- 07.02 Apply advanced technical knowledge and skills in the construction of a structure.

08.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT SELECTING AND PREPARING A CONSTRUCTION SITE--The student will be able to:

- 08.01 Explain the steps and processes for identifying, negotiating, selecting, and acquiring sites for construction.

08.02 Explain and perform the technical skills for surveying or mapping a construction site.
08.03 Describe the tools, equipment, and technical skills required for excavating a construction site.
08.04 Explain the load bearing importance of the earth and the reason for soil testing at a construction site.

09.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT DESIGNING AND ENGINEERING CONSTRUCTED WORKS--The student will be able to:

09.01 Read and interpret architectural drawings, blueprints, symbols, and construction plans.
09.02 Describe building codes, permits, and inspection requirements.
09.03 Sketch or draw a plan for a construction project.

10.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONTRACTING, ESTIMATING, BIDDING, AND SCHEDULING--The student will be able to:

10.01 Estimate construction costs using various methods including a computer.
10.02 Read and prepare bid invitations for contractors to build a construction project.
10.03 Establish criteria for awarding a construction contract.
10.04 Describe the content of a construction contract and performance bond.

11.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTING SUBSTRUCTURES--The student will be able to:

11.01 Describe the types, parts, and purposes of foundations.
11.02 Describe the tools, materials, and processes for setting foundations.
11.03 Mix, place, and finish concrete for a floor, wall, or footing.
11.04 Perform the masonry technical skills of laying brick or block.

12.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTING SUPERSTRUCTURES--The student will be able to:

12.01 Describe mass, solid wall, frame, and air-supported superstructures.
12.02 Describe the materials used in the construction of superstructures.
12.03 Use technical carpentry skills, tools, and materials in constructing a wood frame superstructure.
12.04 Use technical construction skills in building a steel or concrete frame superstructure.
12.05 Describe factory manufacturing of superstructures and modules.

13.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT INSTALLING UTILITIES--The student will be able to:

13.01 Describe public utility systems for supplying water, electricity, natural gas, and sewerage.
13.02 Describe the functions and operation of heating, cooling, and ventilating systems.
13.03 Demonstrate a technical knowledge of plumbing and electrical systems in homes or buildings.
13.04 Use the technical tools and skills to install plumbing and electrical systems utilities.
13.05 Diagnose and troubleshoot problems with utility systems.

14.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ENCLOSING SUPERSTRUCTURES--The student will be able to:

14.01 Describe the different types of materials and methods for constructing interior and exterior walls.
14.02 Describe the different types of materials and methods for laying floors and for building roofs.
14.03 Describe the different types of methods for constructing or installing windows and doors.
14.04 Describe the purposes, materials, and methods for insulating enclosed superstructures.
14.05 Perform the technical skills of enclosing a superstructure.

15.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT INTERIOR AND EXTERIOR FINISHING OF A CONSTRUCTED STRUCTURE--The student will be able to:

- 15.01 Describe the different types of materials and methods for trimming, painting, and decorating a constructed structure.
- 15.02 Describe the types of accessories and fixtures that are installed to finish completed construction.
- 15.03 Explain the materials and methods used for the finishing processes of paving and landscaping.
- 15.04 Participate in processes of finishing a construction project and site.

16.0 PERFORM ADVANCED STUDY AND TECHNICAL SKILLS RELATED TO CONSTRUCTION TECHNOLOGY--The student will be able to:

- 16.01 Select an individual or group project in cooperation with the teacher.
- 16.02 Develop a written plan of work to carry out the project.
- 16.03 Show evidence of technical study in support of the project.
- 16.04 Perform skills related to the project.
- 16.05 Complete the project as planned.

17.0 OPERATE A COMPUTER UTILIZING A PROGRAM RELATED TO CONSTRUCTION TECHNOLOGY--The student will be able to:

- 17.01 Collect or produce data on construction technology through the operation of a computer.

18.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT REGIONAL PLANNING AND THE CONSTRUCTION OF CIVIL OR COMMUNITY STRUCTURES--The student will be able to:

- 18.01 Discuss community and regional planning needs and processes for the construction of roads, parks, dams, airports, seaports, warehouses, shopping centers, factories, and skyscrapers.
- 18.02 Develop a scale model of one of the above structures and give a report on the need.

19.0 CONDUCT STRUCTURAL TESTS ON CONSTRUCTED STRUCTURES AND CONSTRUCTION MATERIALS--The student will be able to:

- 19.01 Perform scientific and technical tests on the strength, life, and uses of structures.
- 19.02 Perform scientific and technical tests on a variety of construction materials.

20.0 CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON A CONSTRUCTION MATERIAL OR PROCESS--The student will be able to:

- 20.01 Identify a problem.
- 20.02 State a need to research the problem.
- 20.03 Form a hypothesis about the problem.
- 20.04 Plan the procedures for researching the problem.
- 20.05 Conduct the research following the planned procedures.
- 20.06 Present the research findings in a seminar.
- 20.07 State conclusions based on the research findings.

STUDENT PERFORMANCE STANDARDS — EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts — COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Construction — PROGRAM NUMBER: 8600700

COURSE TITLE: Introduction to Construction — COURSE NUMBER: 8600710

COURSE DESCRIPTION:

This course provides students with an introduction to the knowledge, human relations, and technical skills of construction technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE CONSTRUCTION TECHNOLOGY LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safety standards.
- 01.06 Safely use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 02.02 Participate as an effective team member.
- 02.03 Follow oral and written instructions.
- 02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 03.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 03.02 Apply basic mathematical skills while completing selected technological assignments.
- 03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 04.01 Define terms related to computer parts and usage.
- 04.02 List ways in which computers are used in construction technology.
- 04.03 Discuss advantages and disadvantages in the use of computers.
- 04.04 Demonstrate the application of a computer.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 05.01 Define entrepreneurship.
- 05.02 Describe the importance of entrepreneurship to the American economy.
- 05.03 List the advantages and disadvantages of business ownership.
- 05.04 Identify the risks involved in ownership of a business.
- 05.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 05.06 Identify the business skills needed to operate a small business efficiently and effectively.

06.0 DEMONSTRATE BASIC TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTION TECHNOLOGY--The student will be able to:

- 06.01 Demonstrate basic technical knowledge and skills about student performance standards 08.01 through 15.04.
- 06.02 Demonstrate basic technical knowledge and skills in the construction of a structure.

08.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT SELECTING AND PREPARING A CONSTRUCTION SITE--The student will be able to:

- 08.01 Explain the steps and processes for identifying, negotiating, selecting, and acquiring sites for construction.

08.02 Explain and perform the technical skills for surveying or mapping a construction site.
08.03 Describe the tools, equipment, and technical skills required for excavating a construction site.
08.04 Explain the load bearing importance of the earth and the reason for soils testing at a construction site.

09.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT DESIGNING AND ENGINEERING CONSTRUCTED WORKS--The student will be able to:

09.01 Read and interpret architectural drawings, blueprints, symbols, and construction plans.
09.02 Describe building codes, permits, and inspection requirements.
09.03 Sketch or draw a plan for a construction project.

10.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONTRACTING, ESTIMATING, BIDDING, AND SCHEDULING--The student will be able to:

10.01 Estimate construction costs using various methods including a computer.
10.02 Read and prepare bid invitations for contractors to build a construction project.
10.03 Establish criteria for awarding a construction contract.
10.04 Describe the content of a construction contract and performance bond.

11.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTING SUBSTRUCTURES--The student will be able to:

11.01 Describe the types, parts, and purposes of foundations.
11.02 Describe the tools, materials, and processes for setting foundations.
11.03 Mix, place, and finish concrete for a floor, wall, or footing.
11.04 Perform the masonry technical skills of laying brick or block.

12.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTING SUPERSTRUCTURES--The student will be able to:

12.01 Describe mass, solid wall, frame, and air-supported superstructures.
12.02 Describe the materials used in the construction of superstructures.
12.03 Use technical carpentry skills, tools, and materials in constructing a wood frame superstructure.
12.04 Use technical construction skills in building a steel or concrete frame superstructure.
12.05 Describe factory manufacturing of superstructures and modules.

13.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT INSTALLING UTILITIES--The student will be able to:

13.01 Describe public utility systems for supplying water, electricity, natural gas, and sewerage.
13.02 Describe the functions and operation of heating, cooling, and ventilating systems.
13.03 Demonstrate a technical knowledge of plumbing and electrical systems in homes or buildings.
13.04 Use the technical tools and skills to install plumbing and electrical systems utilities.
13.05 Diagnose and troubleshoot problems with utility systems.

14.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ENCLOSING SUPERSTRUCTURES--The student will be able to:

14.01 Describe the different types of materials and methods for constructing interior and exterior walls.
14.02 Describe the different types of materials and methods for laying floors and for building roofs.
14.03 Describe the different types of methods for constructing or installing windows and doors.
14.04 Describe the purposes, materials, and methods for insulating enclosed superstructures.
14.05 Perform the technical skills of enclosing a superstructure.

15.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT INTERIOR AND EXTERIOR FINISHING OF A CONSTRUCTED STRUCTURE--The student will be able to:

15.01 Describe the different types of materials and methods for trimming, painting, and decorating a constructed structure.
15.02 Describe the types of accessories and fixtures that are installed to finish completed construction.
15.03 Explain the materials and methods used for the finishing processes of paving and landscaping.
15.04 Participate in processes of finishing a construction project and site.

STUDENT PERFORMANCE STANDARDS — EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts — COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Construction — PROGRAM NUMBER: 8600700

COURSE TITLE: Intermediate Construction — COURSE NUMBER: 8600720

COURSE DESCRIPTION:

This course provides students with an expanded study and application of the knowledge, human relations, and technical skills of construction technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE CONSTRUCTION TECHNOLOGY LABORATORY--The student will be able to:

01.01 Follow lab safety rules and procedures.
01.02 Demonstrate good housekeeping at work station and within total lab.
01.03 Conduct lab activities and equipment operations in a safe manner.
01.04 Exercise care and respect for all tools, equipment, and materials.
01.05 Identify OSHA color coding safety standards.
01.06 Safely use hand tools and power equipment.
01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
02.02 Participate as an effective team member.
02.03 Follow oral and written instructions.
02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

03.01 Apply basic English skills while completing selected written and verbal technological assignments.
03.02 Apply basic mathematical skills while completing selected technological assignments.
03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY--The student will be able to:

04.01 Define terms related to computer parts and usage.
04.02 List ways in which computers are used in construction technology.
04.03 Discuss advantages and disadvantages in the use of computers.
04.04 Demonstrate the application of a computer.

07.0 APPLY ADVANCED TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTION TECHNOLOGY--The student will be able to:

07.01 Apply advanced technical knowledge and skills about student performance standards 08.01 through 15.04.
07.02 Apply advanced technical knowledge and skills in the construction of a structure.

08.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT SELECTING AND PREPARING A CONSTRUCTION SITE--The student will be able to:

- 08.01 Explain the steps and processes for identifying, negotiating, selecting, and acquiring sites for construction.
- 08.02 Explain and perform the technical skills for surveying or mapping a construction site.
- 08.03 Describe the tools, equipment, and technical skills required for excavating a construction site.
- 08.04 Explain the load bearing importance of the earth and the reason for soils testing at a construction site.

09.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT DESIGNING AND ENGINEERING CONSTRUCTED WORKS--The student will be able to:

- 09.01 Read and interpret architectural drawings, blueprints, symbols, and construction plans.
- 09.02 Describe building codes, permits, and inspection requirements.
- 09.03 Sketch or draw a plan for a construction project.

10.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONTRACTING, ESTIMATING, BIDDING, AND SCHEDULING--The student will be able to:

- 10.01 Estimate construction costs using various methods including a computer.
- 10.02 Read and prepare bid invitations for contractors to build a construction project.
- 10.03 Establish criteria for awarding a construction contract.
- 10.04 Describe the content of a construction contract and performance bond.

11.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTING SUBSTRUCTURES--The student will be able to:

- 11.01 Describe the types, parts, and purposes of foundations.
- 11.02 Describe the tools, materials, and processes for setting foundations.
- 11.03 Mix, place, and finish concrete for a floor, wall, or footing.
- 11.04 Perform the masonry technical skills of laying brick or block.

12.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT CONSTRUCTING SUPERSTRUCTURES--The student will be able to:

- 12.01 Describe mass, solid wall, frame, and air-supported superstructures.
- 12.02 Describe the materials used in the construction of superstructures.
- 12.03 Use technical carpentry skills, tools, and materials in constructing a wood frame superstructure.
- 12.04 Use technical construction skills in building a steel or concrete frame superstructure.
- 12.05 Describe factory manufacturing of superstructures and modules.

13.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT INSTALLING UTILITIES--The student will be able to:

- 13.01 Describe public utility systems for supplying water, electricity, natural gas, and sewerage.
- 13.02 Describe the functions and operation of heating, cooling, and ventilating systems.
- 13.03 Demonstrate a technical knowledge of plumbing and electrical systems in homes or buildings.
- 13.04 Use the technical tools and skills to install plumbing and electrical systems utilities.
- 13.05 Diagnose and troubleshoot problems with utility systems.

14.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ENCLOSING SUPERSTRUCTURES--The student will be able to:

- 14.01 Describe the different types of materials and methods for constructing interior and exterior walls.
- 14.02 Describe the different types of materials and methods for laying floors and for building roofs.
- 14.03 Describe the different types of methods for constructing or installing windows and doors.

14.04 Describe the purposes, materials, and methods for insulating enclosed superstructures.
14.05 Perform the technical skills of enclosing a superstructure.

15.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT INTERIOR AND EXTERIOR FINISHING OF A CONSTRUCTED STRUCTURE--The student will be able to:

15.01 Describe the different types of materials and methods for trimming, painting, and decorating a constructed structure.
15.02 Describe the types of accessories and fixtures that are installed to finish completed construction.
15.03 Explain the materials and methods used for the finishing processes of paving and landscaping.
15.04 Participate in processes of finishing a construction project and site.

STUDENT PERFORMANCE STANDARDS — EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts — COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Construction — PROGRAM NUMBER: 8600700

COURSE TITLE: Construction - Individual Study — COURSE NUMBER: 8600730

COURSE DESCRIPTION:

This course provides students with an advanced study and application of the knowledge, human relations, and technical skills of construction technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE CONSTRUCTION TECHNOLOGY LABORATORY--The student will be able to:

01.01 Follow lab safety rules and procedures.
01.02 Demonstrate good housekeeping at work station and within total lab.
01.03 Conduct lab activities and equipment operations in a safe manner.
01.04 Exercise care and respect for all tools, equipment, and materials.
01.05 Identify OSHA color coding safety standards.
01.06 Safely use hand tools and power equipment.
01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
02.02 Participate as an effective team member.
02.03 Follow oral and written instructions.
02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

03.01 Apply basic English skills while completing selected written and verbal technological assignments.
03.02 Apply basic mathematical skills while completing selected technological assignments.
03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY--The student will be able to:

04.01 Define terms related to computer parts and usage.
04.02 List ways in which computers are used in construction technology.
04.03 Discuss advantages and disadvantages in the use of computers.
04.04 Demonstrate the application of a computer.

16.0 PERFORM ADVANCED STUDY AND TECHNICAL SKILLS RELATED TO ENERGY AND CONSTRUCTION TECHNOLOGY--The student will be able to:

16.01 Select an individual or group project in cooperation with the teacher.

16.02 Develop a written plan of work to carry out the project.
16.03 Show evidence of technical study in support of the project.
16.04 Perform skills related to the project.
16.05 Complete the project as planned.

17.0 OPERATE A COMPUTER UTILIZING A PROGRAM RELATED TO CONSTRUCTION TECHNOLOGY--The student will be able to:

17.01 Collect or produce data on construction technology through the operation of a computer.

18.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT REGIONAL PLANNING AND THE CONSTRUCTION OF CIVIL OR COMMUNITY STRUCTURES--The student will be able to:

18.01 Discuss community and regional planning needs and processes for the construction of roads, parks, dams, airports, seaports, warehouses, shopping centers, factories, and skyscrapers.
18.02 Develop a scale model of one of the above structures and give a report on the need

19.0 CONDUCT STRUCTURAL TESTS ON CONSTRUCTED STRUCTURES AND CONSTRUCTION MATERIALS--The student will be able to:

19.01 Perform scientific and technical tests on the strength, life, and uses of structures.
19.02 Perform scientific and technical tests on a variety of construction materials.

20.0 CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON A CONSTRUCTION MATERIAL OR PROCESS--The student will be able to:

20.01 Identify a problem.
20.02 State a need to research the problem.
20.03 Form a hypothesis about the problem.
20.04 Plan the procedures for researching the problem.
20.05 Conduct the research following the planned procedures.
20.06 Present the research findings in a seminar.
20.07 State conclusions based on the research findings.

CURRICULUM FRAMEWORK | PROGRAM AREA: Industrial Arts

FLORIDA DEPARTMENT OF EDUCATION | EFFECTIVE DATE: July, 1987

PROGRAM TITLE: Pretechnical Drafting

CODE NUMBER: Secondary 8600800 Postsecondary _____

Florida CIP IA21.010300

SECONDARY SCHOOL CREDITS	COLLEGE CREDITS	POSTSECONDARY ADULT VOCATIONAL CREDITS
3	_____	_____

APPLICABLE LEVEL(S): _____ 7-9 x 9-12 _____ Postsecondary Adult Vocational

_____ Postsecondary Vocational x Other 21

CERTIFICATION COVERAGE: INDUS ARTS 4 @ 6, GEN SHOP @ 4, GRAPHIC ARTS 4, DRAFTING 7

I. MAJOR CONCEPTS/CONTENT: The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of drafting technology.

The content includes, but is not limited to, a study of the purposes, instruments, processes, and technical skills of drafting technology. The content and activities will also include the study of entrepreneurship, safety, and leadership skills.

Listed below are the courses that make up this program at the secondary level.

8600810 Introduction to Drafting
8600820 Intermediate Drafting
8600830 Drafting - Individual Study

II. LABORATORY ACTIVITIES: Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the tools and materials appropriate to the course content.

III. SPECIAL NOTE: The Florida American Industrial Arts Student Association is the appropriate vocational student organization for providing leadership training experiences and for reinforcing specific vocational skills. When provided, the activities are considered an integral part of this instructional program.

IV. INTENDED OUTCOMES: After successfully completing this program, the student will be able to:

01. Use proper and safe procedures in the drafting technology laboratory.
02. Demonstrate positive human relations and leadership skills.
03. Apply basic skills in English, mathematics, and science appropriate to technological content and learning activities.
04. Demonstrate computer literacy and application.
05. Demonstrate an understanding of entrepreneurship.
06. Demonstrate technical knowledge and skills about the use and care of drafting instruments, equipment, and materials.
07. Demonstrate technical skills and applications common to all types of drafting.
08. Demonstrate technical knowledge and skills for making orthographic drawings.
09. Demonstrate technical knowledge and skills for making pictorial drawings.
10. Demonstrate technical knowledge and skills for making auxiliary view drawings.
11. Demonstrate technical knowledge and skills for making sectional view drawings.
12. Demonstrate technical knowledge and skills for making engineering drawings.
13. Demonstrate technical knowledge and skills for making architectural drawings.

14. Demonstrate technical knowledge and skills for making technical illustrations.
15. Demonstrate basic technical knowledge and skills for making a computer assisted drafting (CAD).
16. Perform advanced study and technical skills related to drafting technology.
17. Operate a computer utilizing a program related to drafting technology.
18. Demonstrate technical knowledge and skills about modeling as a drafting aid.
19. Demonstrate technical knowledge and skills about the fundamentals of design and design procedures.
20. Conduct a research and experimentation project on drafting technology.

STUDENT PERFORMANCE STANDARDS EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts SECONDARY NUMBER: 8600800

PROGRAM TITLE: Pretechnical Drafting

01.0 USE PROPER AND SAFE PROCEDURES IN THE DRAFTING TECHNOLOGY LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safety standards.
- 01.06 Safely use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 02.02 Participate as an effective team member.
- 02.03 Follow oral and written instructions.
- 02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 03.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 03.02 Apply basic mathematical skills while completing selected technological assignments.
- 03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 04.01 Define terms related to computer parts and usage.
- 04.02 List ways in which computers are used in drafting technology.
- 04.03 Discuss advantages and disadvantages in the use of computers.
- 04.04 Demonstrate the application of a computer.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 05.01 Define entrepreneurship.
- 05.02 Describe the importance of entrepreneurship to the American economy.
- 05.03 List the advantages and disadvantages of business ownership.
- 05.04 Identify the risks involved in ownership of a business.
- 05.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 05.06 Identify the business skills needed to operate a small business efficiently and effectively.

06.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT THE USE AND CARE OF DRAFTING INSTRUMENTS, EQUIPMENT, AND MATERIALS--The student will be able to:

- 06.01 Identify and demonstrate technical knowledge and skills about the use and care of drafting instruments.
- 06.02 Identify and demonstrate technical knowledge and skills about the use and care of drafting equipment.
- 06.03 Demonstrate technical knowledge and skills about the properties, specifications, and use of drafting materials and supplies.

07.0 DEMONSTRATE TECHNICAL SKILLS AND APPLICATIONS COMMON TO ALL TYPES OF DRAFTING--The student will be able to:

- 07.01 Use proper drafting symbols and alphabet of lines in accordance with technical standards and practices.
- 07.02 Apply proper lettering techniques.
- 07.03 Apply geometric construction techniques.
- 07.04 Interpret information from drawings, prints, and sketches.
- 07.05 Make freehand sketches.

07.06 Produce and reproduce drawings using modern technical methods for drafting reproduction.

08.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING ORTHOGRAPHIC DRAWINGS--The student will be able to:

08.01 Explain the theory of orthographic projection.
08.02 Identify the six principal views of an object.
08.03 Produce a three-view orthographic drawing.

09.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING PICTORIAL DRAWINGS--The student will be able to:

09.01 Explain methods of pictorial drawing.
09.02 Produce an isometric drawing.
09.03 Produce an oblique drawing.
09.04 Produce a perspective drawing.

10.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING AUXILIARY VIEW DRAWINGS--The student will be able to:

10.01 Describe the terms normal view, inclined surface, and skewed surface.
10.02 Produce an auxiliary view drawing.

11.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING SECTIONAL VIEW DRAWINGS--The student will be able to:

11.01 Define sectional view.
11.02 Describe types of sectional views.
11.03 Illustrate the types of breaks and symbols used in drawing sectional views.
11.04 Produce a sectional view drawing.

12.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING ENGINEERING DRAWINGS--The student will be able to:

12.01 Produce detailed machine drawings with tolerances, cams, gears, hidden surfaces and other mechanical details.
12.02 Produce detailed assembly drawings with screws, keys, rivets, welded joints, and other assembly details.
12.03 Produce detailed electronic schematics with circuits, power sources, controls, and other electronic components.

13.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING ARCHITECTURAL DRAWINGS--The student will be able to:

13.01 Produce dimensioned floor plan drawings showing walls, windows, doors, cabinets, stairs, appliances, fixtures, and other details.
13.02 Produce dimensioned elevation drawings showing grade lines, floors, ceilings, windows, doors, and other details.
13.03 Produce a dimensioned architectural electrical plan.
13.04 Produce a dimensioned architectural plumbing plan.
13.05 Produce a dimensioned architectural climate control plan.
13.06 Produce a dimensioned plot plan for a construction site.

14.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING TECHNICAL ILLUSTRATIONS--The student will be able to:

14.01 Produce a colored or shaded pictorial rendering for presentation.
14.02 Produce a labeled graph or chart for display.
14.03 Produce a dimensioned map or topographic drawing of land, sea, or air boundaries.

15.0 DEMONSTRATE BASIC TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING A COMPUTER ASSISTED DRAFTING (CAD)--The student will be able to:

15.01 Apply basic knowledge and skills of drafting on CAD systems by completing assigned drawings in either the engineering, architectural, or technical illustrations classification.
15.02 Plot a drawing generated by CAD.

16.0 PERFORM ADVANCED STUDY AND TECHNICAL SKILLS RELATED TO DRAFTING TECHNOLOGY--The student will be able to:

- 16.01 Select an individual or group project in cooperation with the teacher.
- 16.02 Develop a written plan of work to carry out the project.
- 16.03 Show evidence of technical study in support of the project.
- 16.04 Perform skills related to the project.
- 16.05 Complete the project as planned.

17.0 OPERATE A COMPUTER UTILIZING A PROGRAM RELATED TO DRAFTING TECHNOLOGY--The student will be able to:

- 17.01 Collect or produce data on drafting technology through the operation of a computer.

18.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT MODELING AS A DRAFTING AID--The student will be able to:

- 18.01 Demonstrate the technical skills of producing a clay, wax, wood, plastic, or cardboard scale model.
- 18.02 Build a scale model to represent an architectural design, prototype design, plot-plan, route layout, equipment design, or equipment arrangement.
- 18.03 Demonstrate the use of photography in producing or presenting model photo drawings.

19.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT THE FUNDAMENTALS OF DESIGN AND DESIGN PROCEDURES--The student will be able to:

- 19.01 Describe the basic principles and functions of good design.
- 19.02 Outline steps and procedures followed in the industrial design of a product.
- 19.03 Demonstrate ways in which designs are presented to manufacturers and to customers.
- 19.04 Develop a variety of designs using conventional methods and a CAD system.

20.0 CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON DRAFTING TECHNOLOGY--The student will be able to:

- 20.01 Identify a problem.
- 20.02 State a need to research the problem.
- 20.03 Form a hypothesis about the problem.
- 20.04 Plan the procedures for researching the problem.
- 20.05 Conduct the research following the planned procedures.
- 20.06 Present the research findings in a seminar.
- 20.07 State conclusions based on the research findings.

STUDENT PERFORMANCE STANDARDS | EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts | COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Drafting | PROGRAM NUMBER: 8600800

COURSE TITLE: Introduction to Drafting | COURSE NUMBER: 8600810

COURSE DESCRIPTION:

This course provides students with an introduction to the knowledge, human relations, and technical skills of drafting technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE DRAFTING TECHNOLOGY LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safety standards.
- 01.06 Safely use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 02.02 Participate as an effective team member.
- 02.03 Follow oral and written instructions.
- 02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 03.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 03.02 Apply basic mathematical skills while completing selected technological assignments.
- 03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 04.01 Define terms related to computer parts and usage.
- 04.02 List ways in which computers are used in drafting technology.
- 04.03 Discuss advantages and disadvantages in the use of computers.
- 04.04 Demonstrate the application of a computer.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPPENEURSHIP--The student will be able to:

- 05.01 Define entrepreneurship.
- 05.02 Describe the importance of entrepreneurship to the American economy.
- 05.03 List the advantages and disadvantages of business ownership.
- 05.04 Identify the risks involved in ownership of a business.
- 05.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 05.06 Identify the business skills needed to operate a small business efficiently and effectively.

06.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT THE USE AND CARE OF DRAFTING INSTRUMENTS, EQUIPMENT, AND MATERIALS--The student will be able to:

- 06.01 Identify and demonstrate technical knowledge and skills about the use and care of drafting instruments.
- 06.02 Identify and demonstrate technical knowledge and skills about the use and care of drafting equipment.
- 06.03 Demonstrate technical knowledge and skills about the properties, specifications, and use of drafting materials and supplies.

07.0 DEMONSTRATE TECHNICAL SKILLS AND APPLICATIONS COMMON TO ALL TYPES OF DRAFTING--The student will be able to:

- 07.01 Use proper drafting symbols and alphabet of lines in accordance with technical standards and practices.
- 07.02 Apply proper lettering techniques.
- 07.03 Apply geometric construction techniques.
- 07.04 Interpret information from drawings, prints, and sketches.
- 07.05 Make freehand sketches.
- 07.06 Produce and reproduce drawings using modern technical methods for drafting reproduction.

08.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING ORTHOGRAPHIC DRAWINGS--The student will be able to:

- 08.01 Explain the theory of orthographic projection.
- 08.02 Identify the six principal views of an object.
- 08.03 Produce a three-view orthographic drawing.

09.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING PICTORIAL DRAWINGS--The student will be able to:

- 09.01 Explain methods of pictorial drawing.
- 09.02 Produce an isometric drawing.
- 09.03 Produce an oblique drawing.
- 09.04 Produce a perspective drawing.

10.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING AUXILIARY VIEW DRAWINGS--The student will be able to:

- 10.01 Describe the terms normal view, inclined surface, and skewed surface.
- 10.02 Produce an auxiliary view drawing.

11.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING SECTIONAL VIEW DRAWINGS--The student will be able to:

- 11.01 Define sectional view.
- 11.02 Describe types of sectional views.
- 11.03 Illustrate the types of breaks and symbols used in drawing sectional views.
- 11.04 Produce a sectional view drawing.

12.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING ENGINEERING DRAWINGS--The student will be able to:

- 12.01 Produce detailed machine drawings with tolerances, cams, gears, hidden surfaces and other mechanical details.
- 12.02 Produce detailed assembly drawings with screws, keys, rivets, welded joints, and other assembly details.
- 12.03 Produce detailed electronic schematics with circuits, power sources, controls, and other electronic components.

STUDENT PERFORMANCE STANDARDS — EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts — COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Drafting — PROGRAM NUMBER: 8600800

COURSE TITLE: Intermediate Drafting — COURSE NUMBER: 8600820

COURSE DESCRIPTION:

This course provides students with an expanded study and application of the knowledge, human relations, and technical skills of drafting technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE DRAFTING TECHNOLOGY LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.

01.03 Conduct lab activities and equipment operations in a safe manner.
01.04 Exercise care and respect for all tools, equipment, and materials.
01.05 Identify OSHA color coding safety standards.
01.06 Safely use hand tools and power equipment.
01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
02.02 Participate as an effective team member.
02.03 Follow oral and written instructions.
02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

03.01 Apply basic English skills while completing selected written and verbal technological assignments.
03.02 Apply basic mathematical skills while completing selected technological assignments.
03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

04.01 Define terms related to computer parts and usage.
04.02 List ways in which computers are used in drafting technology.
04.03 Discuss advantages and disadvantages in the use of computers.
04.04 Demonstrate the application of a computer.

13.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING ARCHITECTURAL DRAWINGS--The student will be able to:

13.01 Produce dimensioned floor plan drawings showing walls, windows, doors, cabinets, stairs, appliances, fixtures, and other details.
13.02 Produce dimensioned elevation drawings showing grade lines, floors, ceilings, windows, doors, and other details.
13.03 Produce a dimensioned architectural electrical plan.
13.04 Produce a dimensioned architectural plumbing plan.
13.05 Produce a dimensioned architectural climate control plan.
13.06 Produce a dimensioned plot plan for a construction site.

14.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING TECHNICAL ILLUSTRATIONS--The student will be able to:

14.01 Produce a colored or shaded pictorial rendering for presentation.
14.02 Produce a labeled graph or chart for display.
14.03 Produce a dimensioned map or topographic drawing of land, sea, or air boundaries.

15.0 DEMONSTRATE BASIC TECHNICAL KNOWLEDGE AND SKILLS FOR MAKING A COMPUTER ASSISTED DRAFTING (CAD)--The student will be able to:

15.01 Apply basic knowledge and skills of drafting on CAD systems by completing assigned drawings in either the engineering, architectural, or technical illustrations classification.
15.02 Plot a drawing generated by CAD.

STUDENT PERFORMANCE STANDARDS | EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts | COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Drafting | PROGRAM NUMBER: 8600800

COURSE TITLE: Drafting - Individual Study | COURSE NUMBER: 8600830

COURSE DESCRIPTION:

This course provides students with an advanced study and application of the knowledge, human relations, and technical skills of drafting technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE DRAFTING TECHNOLOGY LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safety standards.
- 01.06 Safely use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 02.02 Participate as an effective team member.
- 02.03 Follow oral and written instructions.
- 02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 03.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 03.02 Apply basic mathematical skills while completing selected technological assignments.
- 03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 04.01 Define terms related to computer parts and usage.
- 04.02 List ways in which computers are used in drafting technology.
- 04.03 Discuss advantages and disadvantages in the use of computers.
- 04.04 Demonstrate the application of a computer.

16.0 PERFORM ADVANCED STUDY AND TECHNICAL SKILLS RELATED TO DRAFTING TECHNOLOGY--The student will be able to:

- 16.01 Select an individual or group project in cooperation with the teacher.
- 16.02 Develop a written plan of work to carry out the project.
- 16.03 Show evidence of technical study in support of the project.
- 16.04 Perform skills related to the project.
- 16.05 Complete the project as planned.

17.0 OPERATE A COMPUTER UTILIZING A PROGRAM RELATED TO DRAFTING TECHNOLOGY--The student will be able to:

- 17.01 Collect or produce data on drafting technology through the operation of a computer.

18.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT MODELING AS A DRAFTING AID--The student will be able to:

- 18.01 Demonstrate the technical skills of producing a clay, wax, wood, plastic, or cardboard scale model.
- 18.02 Build a scale model to represent an architectural design, prototype design, plot-plan, route layout, equipment design, or equipment arrangement.
- 18.03 Demonstrate the use of photography in producing or presenting model photo drawings.

19.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT THE FUNDAMENTALS OF DESIGN AND DESIGN PROCEDURES--The student will be able to:

19.01 Describe the basic principles and functions of good design.
19.02 Outline steps and procedures followed in the industrial design of a product.
19.03 Demonstrate ways in which designs are presented to manufacturers and to customers.
19.04 Develop a variety of designs using conventional methods and a CAD system.

20.0 CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON DRAFTING TECHNOLOGY--The student will be able to:

20.01 Identify a problem.
20.02 State a need to research the problem.
20.03 Form a hypothesis about the problem.
20.04 Plan the procedures for researching the problem.
20.05 Conduct the research following the planned procedures.
20.06 Present the research findings in a seminar.
20.07 State conclusions based on the research findings.

CURRICULUM FRAMEWORK — PROGRAM AREA: Industrial Arts

FLORIDA DEPARTMENT OF EDUCATION — EFFECTIVE DATE: July, 1987

PROGRAM TITLE: Pretechnical Electronics

CODE NUMBER: Secondary 8600900 — Postsecondary _____

Florida CIP IA21.010400

SECONDARY SCHOOL CREDITS 3 — COLLEGE CREDITS _____ — POSTSECONDARY ADULT VOCATIONAL CREDITS _____

APPLICABLE LEVEL(S): _____ 7-9 __x__ 9-12 _____ Postsecondary Adult Vocational

_____ Postsecondary Vocational __x__ Other 21

CERTIFICATION COVERAGE: INDUS ARTS 4 @ 6, GEN SHOP @ 4 — ELECTRONICS 7, ELECTRICAL 4, 7 — TEC ELEC @ 7

I. MAJOR CONCEPTS/CONTENT: The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of electronics technology.

The content includes, but is not limited to, the theory, use, and technical application of electronics technology. The content and activities will also include the study of entrepreneurship, safety, and leadership skills.

Listed below are the courses that make up this program at the secondary level.

8600910 Introduction to Electronics
8600920 Intermediate Electronics
8600930 Electronics - Individual Study

II. LABORATORY ACTIVITIES: Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the tools and materials appropriate to the course content.

III. SPECIAL NOTE: The Florida American Industrial Arts Student Association is the appropriate vocational student organization for providing leadership training experiences and for reinforcing specific vocational skills. When provided, these activities are considered an integral part of this instructional program.

IV. INTENDED OUTCOMES: After successfully completing this program, the student will be able to:

01. Use proper and safe procedures in the electronics technology laboratory.
02. Demonstrate positive human relations and leadership skills.
03. Apply basic skills in English, mathematics, and science appropriate to technological content and learning activities.
04. Demonstrate computer literacy and application.
05. Demonstrate an understanding of entrepreneurship.
06. Describe the structure of matter related to electronics.
07. Describe, construct, conduct, and analyze experiments with basic DC and AC circuits and with circuits using magnetism.
08. Identify, measure, and describe the function of transformers and inductors in electronic circuits.
09. Use Ohm's law and Watt's law to analyze and experiment with resistive circuits.
10. Describe, construct, analyze, and experiment with capacitive circuits.
11. Describe and experiment with integrated circuits.
12. Demonstrate the use of electronic equipment.
13. Demonstrate proper electronic assembly methods.
14. Demonstrate an understanding of basic electrical circuits and electronic systems.
15. Describe, conduct, and experiment with circuits using semiconductors.
16. Perform advanced study and technical skills related to electronics technology.
17. Demonstrate an understanding of the principles and applications of

microcomputer systems.
18. Describe, identify, and correct problems in electronic circuits.
19. Demonstrate technical knowledge and skills about electronic networks and systems.
20. Conduct a research and experimentation project on an electronic system or process.

STUDENT PERFORMANCE STANDARDS EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts SECONDARY NUMBER: 8600900

PROGRAM TITLE: Pretechnical Electronics

01.0 USE PROPER AND SAFE PROCEDURES IN THE ELECTRONICS TECHNOLOGY LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safely standards.
- 01.06 Safely use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 02.02 Participate as an effective team member.
- 02.03 Follow oral and written instructions.
- 02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 03.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 03.02 Apply basic mathematical skills while completing selected technological assignments.
- 03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 04.01 Define terms related to computer parts and usage.
- 04.02 List ways in which computers are used in electronics technology.
- 04.03 Discuss advantages and disadvantages in the use of computers.
- 04.04 Demonstrate the application of a computer.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 05.01 Define entrepreneurship.
- 05.02 Describe the importance of entrepreneurship to the American economy.
- 05.03 List the advantages and disadvantages of business ownership.
- 05.04 Identify the risks involved in ownership of a business.
- 05.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 05.06 Identify the business skills needed to operate a small business efficiently and effectively.

06.0 DESCRIBE THE STRUCTURE OF MATTER RELATED TO ELECTRONICS--The student will be able to:

- 06.01 Describe the composition of elements, mixtures, and compounds according to the electron theory.
- 06.02 List the atomic subparticles.
- 06.03 Diagram and show the relationship between electrons, protons, and neutrons.
- 06.04 State the law of electrical charges.
- 06.05 Describe the classification and characteristics of materials as they apply to conductors, insulators, and semiconductors.
- 06.06 Demonstrate proficiency in the identification of electronics symbols.

07. DESCRIBE, CONSTRUCT, CONDUCT, AND ANALYZE EXPERIMENTS WITH BASIC DC AND AC CIRCUITS AND WITH CIRCUITS USING MAGNETISM--The student will be able to:

- 07.01 Solve electronic math problems related to DC and AC circuits.
- 07.02 Define voltage, current, resistance, power, and energy.
- 07.03 Set up and test basic circuits.
- 07.04 Set up and operate multimeters in DC and AC circuits.

07.05 Set up and operate power supplies in DC circuits.
07.06 Describe magnetism, the law of magnetic poles, and the behavior of flux lines.
07.07 Demonstrate electromagnetism.
07.08 Construct simple circuits using a relay.

08.0 IDENTIFY, MEASURE, AND DESCRIBE THE FUNCTION OF TRANSFORMERS AND INDUCTORS IN ELECTRONIC CIRCUITS--The student will be able to:

08.01 Explain the theory of operation and application of inductance in inductors and transformers.
08.02 Explain what an inductor is and what its purpose is.
08.03 Construct circuits using transformers and inductors.
08.04 Explain inductive reactance.

09.0 USE OHM'S LAW AND WATT'S LAW TO ANALYZE AND EXPERIMENT WITH RESISTIVE CIRCUITS--The student will be able to:

09.01 Identify resistor by color code.
09.02 Identify and measure resistors.
09.03 Apply Ohm's law to circuits.
09.04 Explain how resistors are constructed.
09.05 Apply Watt's law to circuits.
09.06 Use a VOM to verify values.
09.07 Identify different types of resistors, and explain their use and ratings.

10.0 DESCRIBE, CONSTRUCT, ANALYZE AND EXPERIMENT WITH CAPACITIVE CIRCUITS--The student will be able to:

10.01 Explain how a capacitor stores electrical energy.
10.02 Explain how a capacitor is constructed.
10.03 Explain capacitive reactance.

11.0 DESCRIBE AND EXPERIMENT WITH INTEGRATED CIRCUITS--The student will be able to:

11.01 Explain what integrated circuits (ICs) are and how they are manufactured.
11.02 Explain the advantages of integrated circuits as compared to discrete component circuits.
11.03 Construct electronic circuits which contain ICs.
11.04 Describe the basic types of integrated circuit design, along with their pin numbering systems and dimensions.

12.0 DEMONSTRATE THE USE OF ELECTRONIC EQUIPMENT--The student will be able to:

12.01 Use a VOM to obtain accurate measurements.
12.02 Apply safety rules in the use of electronic instruments and demonstrate proper care and maintenance for the equipment during storage and use.
12.03 Use voltmeters, ammeters, and ohmmeters to obtain accurate measurements.
12.04 Set up and use an oscilloscope to observe waveforms and to determine the voltage of the signal presented.
12.05 Use signal generators to produce waveforms of selected frequencies and shapes.
12.06 Use testers to determine the condition of electronic components.

13.0 DEMONSTRATE PROPER ELECTRONIC ASSEMBLY METHODS--The student will be able to:

13.01 Exhibit safe soldering techniques.
13.02 Identify proper soldering practices.
13.03 Demonstrate proper soldering applications.
13.04 Identify common electrical and electronics hand tools.
13.05 Demonstrate electronic component assembly.
13.06 Apply electrical tape to a spliced and soldered wire connection.
13.07 Solder and desolder components and wires.
13.08 Describe the two methods of making a printed circuit board.

14.0 DEMONSTRATE AN UNDERSTANDING OF BASIC ELECTRICAL CIRCUITS AND ELECTRONIC SYSTEMS--The student will be able to:

- 14.01 Identify problems and demonstrate appropriate solutions when dealing with series, series-parallel, parallel, voltage dividers, and network circuits.
- 14.02 Define electronic systems.
- 14.03 Describe the importance of electronic systems in today's technology world.
- 14.04 Define electronic input, process and output of electronic systems.
- 14.05 Conduct electronic experiments using input, process and output systems.
- 14.06 Describe, design and conduct experiments with electronic systems.

15.0 DESCRIBE, CONSTRUCT, AND EXPERIMENT WITH CIRCUITS USING SEMICONDUCTORS--The student will be able to:

- 15.01 Describe the general theory and application of semiconductor devices.
- 15.02 Explain the difference between N-type and P-type material.
- 15.03 Explain the precautions necessary when working with solid state devices.
- 15.04 Demonstrate the proper procedures for the installation of solid state components using thermal release devices (heat sinks).
- 15.05 Construct and experiment with semiconductor devices.
- 15.06 Construct and test circuits which contain solid state components such as FET's, SCR's, UJT's, tunnel diodes, zener diodes, light emitting diodes, etc.

16.0 PERFORM ADVANCED STUDY AND SKILLS RELATED TO ELECTRONICS--The student will be able to:

- 16.01 Select an individual or group project in cooperation with the teacher.
- 16.02 Develop a written plan of work to carry out the project.
- 16.03 Show evidence of technical study in support of the project.
- 16.04 Perform skills related to the project.
- 16.05 Complete the project as planned.

17.0 DEMONSTRATE AN UNDERSTANDING OF THE PRINCIPLES AND APPLICATIONS OF MICROCOMPUTER SYSTEMS--The student will be able to:

- 17.01 Define microcomputer systems.
- 17.02 Describe the importance of microcomputer systems in today's technology world.
- 17.03 Describe microcomputer applications in today's technology world.
- 17.04 Define microcomputer interfacing.
- 17.05 Conduct microcomputer systems experiments.
- 17.06 Conduct microcomputer systems interfacing, sensing and control applications.

18.0 DESCRIBE, IDENTIFY, AND CORRECT PROBLEMS IN ELECTRONIC CIRCUITS--The student will be able to:

- 18.01 Identify problems and demonstrate solutions when dealing with power supplies, oscillators, and amplifiers.

19.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ELECTRONIC NETWORKS AND SYSTEMS--The student will be able to:

- 19.01 Define and describe telecommunications.
- 19.02 Conduct telecommunications experiments including receivers, transmitters, wirelines and antennas, telephones and fiber optics.
- 19.03 Describe the technology and organization of electronic guidance systems.
- 19.04 Perform technical skills in building, assembling, servicing, or operating one of the above systems.
- 19.05 Define and describe logic control.
- 19.06 Conduct a logic control experiment.
- 19.07 Define and describe digital communications.
- 19.08 Conduct a digital communications experiment.
- 19.09 Define and describe industrial controls.
- 19.10 Conduct an industrial controls experiment.

20.0 CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON AN ELECTRONIC SYSTEM OR PROCESS--The student will be able to:

20.01 Identify a problem.
20.02 State a need to research the problem.
20.03 Form a hypothesis about the problem.
20.04 Plan the procedures for researching the problem.
20.05 Conduct the research following the planned procedures.
20.06 Present the research findings in a seminar.
20.07 State conclusions based on the research findings.

STUDENT PERFORMANCE STANDARDS | EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts | COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Electronics | PROGRAM NUMBER: 8600900

COURSE TITLE: Introduction to Electronics | COURSE NUMBER: 8600910

COURSE DESCRIPTION:

This course provides students with an introduction to the knowledge, human relations, and technical skills of electronics technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE ELECTRONICS TECHNOLOGY LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safely standards.
- 01.06 Safely use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 02.02 Participate as an effective team member.
- 02.03 Follow oral and written instructions.
- 02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 03.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 03.02 Apply basic mathematical skills while completing selected technological assignments.
- 03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 04.01 Define terms related to computer parts and usage.
- 04.02 List ways in which computers are used in electronics technology.
- 04.03 Discuss advantages and disadvantages in the use of computers.
- 04.04 Demonstrate the application of a computer.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 05.01 Define entrepreneurship.
- 05.02 Describe the importance of entrepreneurship to the American economy.
- 05.03 List the advantages and disadvantages of business ownership.
- 05.04 Identify the risks involved in ownership of a business.
- 05.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 05.06 Identify the business skills needed to operate a small business efficiently and effectively.

06.0 DESCRIBE THE STRUCTURE OF MATTER RELATED TO ELECTRONICS--The student will be able to:

- 06.01 Describe the composition of elements, mixtures, and compounds according to the electron theory.
- 06.02 List the atomic subparticles.
- 06.03 Diagram and show the relationship between electrons, protons, and neutrons.
- 06.04 State the law of electrical charges.
- 06.05 Describe the classification and characteristics of materials as they apply to conductors, insulators, and semiconductors.
- 06.06 Demonstrate proficiency in the identification of electronics symbols.

07. DESCRIBE, CONSTRUCT, CONDUCT, AND ANALYZE EXPERIMENTS WITH BASIC DC AND AC CIRCUITS AND WITH CIRCUITS USING MAGNETISM--The student will be able to:

- 07.01 Solve electronic math problems related to DC and AC circuits.
- 07.02 Define voltage, current, resistance, power, and energy.
- 07.03 Set up and test basic circuits.
- 07.04 Set up and operate multimeters in DC and AC circuits.
- 07.05 Set up and operate power supplies in DC circuits.
- 07.06 Describe magnetism, the law of magnetic poles, and the behavior of flux lines.
- 07.07 Demonstrate electromagnetism.
- 07.08 Construct simple circuits using a relay.

08.0 IDENTIFY, MEASURE, AND DESCRIBE THE FUNCTION OF TRANSFORMERS AND INDUCTORS IN ELECTRONIC CIRCUITS--The student will be able to:

- 08.01 Explain the theory of operation and application of inductance in inductors and transformers.
- 08.02 Explain what an inductor is and what its purpose is.
- 08.03 Construct circuits using transformers and inductors.
- 08.04 Explain inductive reactance.

09.0 USE OHM'S LAW AND WATT'S LAW TO ANALYZE AND EXPERIMENT WITH RESISTIVE CIRCUITS--The student will be able to:

- 09.01 Identify resistor by color code.
- 09.02 Identify and measure resistors.
- 09.03 Apply Ohm's law to circuits.
- 09.04 Explain how resistors are constructed.
- 09.05 Apply Watt's law to circuits.
- 09.06 Use a VOM to verify values.
- 09.07 Identify different types of resistors, and explain their use and ratings.

10.0 DESCRIBE, CONSTRUCT, ANALYZE AND EXPERIMENT WITH CAPACITIVE CIRCUITS--The student will be able to:

- 10.01 Explain how a capacitor stores electrical energy.
- 10.02 Explain how a capacitor is constructed.
- 10.03 Explain capacitive reactance.

12.0 DEMONSTRATE THE USE OF ELECTRONIC EQUIPMENT--The student will be able to:

- 12.01 Use a VOM to obtain accurate measurements.
- 12.02 Apply safety rules in the use of electronic instruments and demonstrate proper care and maintenance for the equipment during storage and use.
- 12.03 Use voltmeters, ammeters, and ohmmeters to obtain accurate measurements.
- 12.04 Set up and use an oscilloscope to observe waveforms and to determine the voltage of the signal presented.
- 12.05 Use signal generators to produce waveforms of selected frequencies and shapes.
- 12.06 Use testers to determine the condition of electronic components.

14.0 DEMONSTRATE AN UNDERSTANDING OF BASIC ELECTRICAL CIRCUITS AND ELECTRONIC SYSTEMS--The student will be able to:

- 14.01 Identify problems and demonstrate appropriate solutions when dealing with series, series-parallel, parallel, voltage dividers, and network circuits.
- 14.02 Define electronic systems.
- 14.03 Describe the importance of electronic systems in today's technology world.
- 14.04 Define electronic input, process and output of electronic systems.
- 14.05 Conduct electronic experiments using input, process and output systems.
- 14.06 Describe, design and conduct experiments with electronic systems.

STUDENT PERFORMANCE STANDARDS — EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts — COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Electronics — PROGRAM NUMBER: 8600900

COURSE TITLE: Intermediate Electronics — COURSE NUMBER: 8600920

COURSE DESCRIPTION:

This course provides students with an expanded study and application of the knowledge, human relations, and technical skills of electronics technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE ELECTRONICS TECHNOLOGY LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safely standards.
- 01.06 Safely use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 02.02 Participate as an effective team member.
- 02.03 Follow oral and written instructions.
- 02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 03.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 03.02 Apply basic mathematical skills while completing selected technological assignments.
- 03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 04.01 Define terms related to computer parts and usage.
- 04.02 List ways in which computers are used in electronics technology.
- 04.03 Discuss advantages and disadvantages in the use of computers.
- 04.04 Demonstrate the application of a computer.

06.0 DESCRIBE THE STRUCTURE OF MATTER RELATED TO ELECTRONICS--The student will be able to:

- 06.01 Describe the composition of elements, mixtures, and compounds according to the electron theory.
- 06.02 List the atomic subparticles.
- 06.03 Diagram and show the relationship between electrons, protons, and neutrons.
- 06.04 State the law of electrical charges.
- 06.05 Describe the classification and characteristics of materials as they apply to conductors, insulators, and semiconductors.
- 06.06 Demonstrate proficiency in the identification of electronics symbols.

07. DESCRIBE, CONSTRUCT, CONDUCT, AND ANALYZE EXPERIMENTS WITH BASIC DC AND AC CIRCUITS AND WITH CIRCUITS USING MAGNETISM--The student will be able to:

- 07.01 Solve electronic math problems related to DC and AC circuits.
- 07.02 Define voltage, current, resistance, power, and energy.
- 07.03 Set up and test basic circuits.
- 07.04 Set up and operate multimeters in DC and AC circuits.
- 07.05 Set up and operate power supplies in DC circuits.
- 07.06 Describe magnetism, the law of magnetic poles, and the behavior of flux lines.
- 07.07 Demonstrate electromagnetism.
- 07.08 Construct simple circuits using a relay.

08.0 IDENTIFY, MEASURE, AND DESCRIBE THE FUNCTION OF TRANSFORMERS AND INDUCTORS IN ELECTRONIC CIRCUITS--The student will be able to:

- 08.01 Explain the theory of operation and application of inductance in inductors and transformers.
- 08.02 Explain what an inductor is and what its purpose is.
- 08.03 Construct circuits using transformers and inductors.
- 08.04 Explain inductive reactance.

09.0 USE OHM'S LAW AND WATT'S LAW TO ANALYZE AND EXPERIMENT WITH RESISTIVE CIRCUITS--The student will be able to:

- 09.01 Identify resistor by color code.
- 09.02 Identify and measure resistors.
- 09.03 Apply Ohm's law to circuits.
- 09.04 Explain how resistors are constructed.
- 09.05 Apply Watt's law to circuits.
- 09.06 Use a VOM to verify values.
- 09.07 Identify different types of resistors, and explain their use and ratings.

10.0 DESCRIBE, CONSTRUCT, ANALYZE AND EXPERIMENT WITH CAPACITIVE CIRCUITS--The student will be able to:

- 10.01 Explain how a capacitor stores electrical energy.
- 10.02 Explain how a capacitor is constructed.
- 10.03 Explain capacitive reactance.

11.0 DESCRIBE AND EXPERIMENT WITH INTEGRATED CIRCUITS--The student will be able to:

- 11.01 Explain what integrated circuits (ICs) are and how they are manufactured.
- 11.02 Explain the advantages of integrated circuits as compared to discrete component circuits.
- 11.03 Construct electronic circuits which contain ICs.
- 11.04 Describe the basic types of integrated circuit design, along with their pin numbering systems and dimensions.

12.0 DEMONSTRATE THE USE OF ELECTRONIC EQUIPMENT--The student will be able to:

- 12.01 Use a VOM to obtain accurate measurements.
- 12.02 Apply safety rules in the use of electronic instruments and demonstrate proper care and maintenance for the equipment during storage and use.
- 12.03 Use voltmeters, ammeters, and ohmmeters to obtain accurate measurements.
- 12.04 Set up and use an oscilloscope to observe waveforms and to determine the voltage of the signal presented.
- 12.05 Use signal generators to produce waveforms of selected frequencies and shapes.
- 12.06 Use testers to determine the condition of electronic components.

13.0 DEMONSTRATE PROPER ELECTRONIC ASSEMBLY METHODS--The student will be able to:

- 13.01 Exhibit safe soldering techniques.
- 13.02 Identify proper soldering practices.
- 13.03 Demonstrate proper soldering applications.
- 13.04 Identify common electrical and electronics hand tools.
- 13.05 Demonstrate electronic component assembly.
- 13.06 Apply electrical tape to a spliced and soldered wire connection.
- 13.07 Solder and desolder components and wires.
- 13.08 Describe the two methods of making a printed circuit board.

14.0 DEMONSTRATE AN UNDERSTANDING OF BASIC ELECTRICAL CIRCUITS AND ELECTRONIC SYSTEMS--The student will be able to:

- 14.01 Identify problems and demonstrate appropriate solutions when dealing with series, series-parallel, parallel, voltage dividers, and network circuits.
- 14.02 Define electronic systems.
- 14.03 Describe the importance of electronic systems in today's technology world.

14.04 Define electronic input, process and output of electronic systems.
14.05 Conduct electronic experiments using input, process and output systems.
14.06 Describe, design and conduct experiments with electronic systems.

15.0 DESCRIBE, CONSTRUCT, AND EXPERIMENT WITH CIRCUITS USING SEMICONDUCTORS--The student will be able to:

15.01 Describe the general theory and application of semiconductor devices.
15.02 Explain the difference between N-type and P-type material.
15.03 Explain the precautions necessary when working with solid state devices.
15.04 Demonstrate the proper procedures for the installation of solid state components using thermal release devices (heat sinks).
15.05 Construct and experiment with semiconductor devices.
15.06 Construct and test circuits which contain solid state components such as FET's, SCR's, UJT's, tunnel diodes, zener diodes, light emitting diodes, etc.

STUDENT PERFORMANCE STANDARDS — EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts — COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Electronics — PROGRAM NUMBER: 8600900

COURSE TITLE: Electronics - Individual Study — COURSE NUMBER: 8600930

COURSE DESCRIPTION:

This course provides students with an advanced study and application of the knowledge, human relations, and technical skills of electronics technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE ELECTRONICS TECHNOLOGY LABORATORY--The student will be able to:

01.01 Follow lab safety rules and procedures.
01.02 Demonstrate good housekeeping at work station and within total lab.
01.03 Conduct lab activities and equipment operations in a safe manner.
01.04 Exercise care and respect for all tools, equipment, and materials.
01.05 Identify OSHA color coding safely standards.
01.06 Safely use hand tools and power equipment.
01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
02.02 Participate as an effective team member.
02.03 Follow oral and written instructions.
02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

03.01 Apply basic English skills while completing selected written and verbal technological assignments.
03.02 Apply basic mathematical skills while completing selected technological assignments.
03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

04.01 Define terms related to computer parts and usage.
04.02 List ways in which computers are used in electronics technology.
04.03 Discuss advantages and disadvantages in the use of computers.
04.04 Demonstrate the application of a computer.

16.0 PERFORM ADVANCED STUDY AND SKILLS RELATED TO ELECTRONICS--The student will be able to:

16.01 Select an individual or group project in cooperation with the teacher.
16.02 Develop a written plan of work to carry out the project.
16.03 Show evidence of technical study in support of the project.
16.04 Perform skills related to the project.
16.05 Complete the project as planned.

17.0 DEMONSTRATE AN UNDERSTANDING OF THE PRINCIPLES AND APPLICATIONS OF MICROCOMPUTER SYSTEMS--The student will be able to:

17.01 Define microcomputer systems.
17.02 Describe the importance of microcomputer systems in today's technology world.
17.03 Describe microcomputer applications in today's technology world.
17.04 Define microcomputer systems experiments.
17.05 Conduct microcomputer systems experiments.
17.06 Conduct microcomputer systems interfacing, sensing and control applications.

18.0 DESCRIBE, IDENTIFY, AND CORRECT PROBLEMS IN ELECTRONIC CIRCUITS--The student will be able to:

18.01 Identify problems and demonstrate solutions when dealing with power supplies, oscillators, and amplifiers.

19.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ELECTRONIC NETWORKS AND SYSTEMS--The student will be able to:

19.01 Define and describe telecommunications.
19.02 Conduct telecommunications experiments including receivers, transmitters, wirelines and antennas, telephones and fiber optics.
19.03 Describe the technology and organization of electronic guidance systems.
19.04 Perform technical skills in building, assembling, servicing, or operating one of the above systems.
19.05 Define and describe logic control.
19.06 Conduct a logic control experiment.
19.07 Define and describe digital communications.
19.08 Conduct a digital communications experiment.
19.09 Define and describe industrial controls.
19.10 Conduct an industrial controls experiment.

20.0 CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON AN ELECTRONIC SYSTEM OR PROCESS--The student will be able to:

20.01 Identify a problem.
20.02 State a need to research the problem.
20.03 Form a hypothesis about the problem.
20.04 Plan the procedures for researching the problem.
20.05 Conduct the research following the planned procedures.
20.06 Present the research findings in a seminar.
20.07 State conclusions based on the research findings.

CURRICULUM FRAMEWORK | PROGRAM AREA: Industrial Arts

FLORIDA DEPARTMENT OF EDUCATION | EFFECTIVE DATE: July, 1987

PROGRAM TITLE: Pretechnical Energy and Power

CODE NUMBER: Secondary 8601200 Postsecondary _____

Florida CIP IA21.010500

SECONDARY SCHOOL CREDITS 3 | COLLEGE CREDITS _____ | POSTSECONDARY ADULT VOCATIONAL CREDITS _____

APPLICABLE LEVEL(S): _____7-9 x 9-12 _____Postsecondary Adult Vocational

_____ Postsecondary Vocational x Other 21

CERTIFICATION COVERAGE: INDUS ARTS 4 @ 6; GEN SHOP @ 4; TRANSPORT 4; AUTO MECH 7; DIESEL MECH 7; AUTO IND @ 7; TECH MECH @ 7; AIR MECH 7; GAS ENG RPR 7

I. MAJOR CONCEPTS/CONTENT: The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of energy and power technology.

The content includes, but is not limited to, a study of power systems and the kinds and sources of energy. The content and activities will also include the study of entrepreneurship, safety, and leadership skills.

Listed below are the courses that comprise this program at the secondary level:

8601210 Introduction to Energy and Power
8601220 Intermediate Energy and Power
8601230 Energy and Power - Individual Study

II. LABORATORY ACTIVITIES: Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the tools and materials appropriate to the course content.

III. SPECIAL NOTE: The Florida American Industrial Arts Student Association is the appropriate vocational student organization for providing leadership training experiences and for reinforcing specific vocational skills. When provided, these activities are considered an integral part of this instructional program.

IV. INTENDED OUTCOMES: After successfully completing this program, the student will be able to:

01. Use proper and safe procedures in the energy and power technology laboratory.
02. Demonstrate positive human relations and leadership skills.
03. Apply basic skills in English, mathematics, and science appropriate to technological content and learning activities.
04. Demonstrate computer literacy and application.
05. Demonstrate an understanding of entrepreneurship.
06. Describe sources of energy.
07. Demonstrate technical knowledge and skills about steam power technology.
08. Demonstrate technical knowledge and skills about diesel engine power technology.
09. Demonstrate technical knowledge and skills about internal combustion power technology.
10. Demonstrate technical knowledge and skills about hydraulic and pneumatic power technology.
11. Demonstrate technical knowledge and skills about electric power technology.
12. Demonstrate technical knowledge and skills about jet engine power technology.
13. Demonstrate technical knowledge and skills about rocket engine power

technology.
14. Demonstrate technical knowledge and skills about solar cells and other fuel cells.
15. Demonstrate technical knowledge and skills about nuclear power technology.
16. Perform advanced study and technical skills related to energy and power.
17. Operate a computer utilizing a program related to energy and power.
18. Demonstrate technical knowledge and skills about powered transportation systems.
19. Measure and report the power and efficiency of power producing systems.
20. Conduct a research and experimentation project on an energy and power system.

STUDENT PERFORMANCE STANDARDS EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts SECONDARY NUMBER: 8601200

PROGRAM TITLE: Pretechnical Energy and Power

01. USE PROPER AND SAFE PROCEDURES IN THE ENERGY AND POWER LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safety standards.
- 01.06 Safety use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 02.02 Participate as a effective team member.
- 02.03 Follow oral and written instructions.
- 02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 03.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 03.02 Apply basic mathematical skills while completing selected technological assignments.
- 03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 04.01 Define terms related to computer parts and usage.
- 04.02 List ways in which computers are used in energy and power technology.
- 04.03 Discuss advantages and disadvantages in the use of computers.
- 04.04 Demonstrate the application of a computer.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 05.01 Define entrepreneurship.
- 05.02 Describe the importance of entrepreneurship to the American economy.
- 05.03 List the advantages and disadvantages of business ownership.
- 05.04 Identify the risks involved in ownership of a business.
- 05.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 05.06 Identify the business skills needed to operate a small business efficiently and effectively.

06.0 DESCRIBE SOURCES OF ENERGY--The student will be able to:

- 06.01 Describe sources of thermal energy.
- 06.02 Describe sources of radiant energy.
- 06.03 Describe sources of nuclear energy.
- 06.04 Describe sources of chemical energy.
- 06.05 Describe sources of electrical energy.
- 06.06 Describe sources of mechanical energy.
- 06.07 Describe sources of fluid energy.

07.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT STEAM POWER TECHNOLOGY--The student will be able to:

- 07.01 Identify and define the key terms, categories, and parts of steam power technology.
- 07.02 Describe the operating theory and principles of steam engines and steam turbines.
- 07.03 Explain the uses and applications of steam power engines and systems.
- 07.04 Identify industries that produce and use steam power systems.

07.05 Describe energy and fuel sources for steam power operations.
07.06 Perform technical skills in building, assembling, maintaining, or operating a steam power system.

08. DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT DIESEL ENGINE POWER TECHNOLOGY--The student will be able to:

08.01 Identify and define key terms, categories, and parts of diesel engine power technology.
08.02 Describe the operating theory and principles of diesel engine power technology.
08.03 Explain the uses and applications of diesel engines.
08.04 Identify industries that produce and use diesel engines.
08.05 Describe energy and fuel sources for diesel engines.
08.06 Perform technical skills in building, assembling, maintaining, or operating diesel engines.

09. DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT INTERNAL COMBUSTION POWER TECHNOLOGY--The student will be able to:

09.01 Identify and define the key terms, categories, and parts of gasoline engine internal combustion technology.
09.02 Describe the operating theory and principles of internal combustion gasoline engines.
09.03 Explain the uses and applications of internal combustion gasoline engines.
09.04 Identify industries that produce and use internal combustion gasoline engines.
09.05 Describe energy and fuel sources for internal combustion gasoline engines.
09.06 Perform technical skills in building, assembling, maintaining, or operating internal combustion gasoline engines.

10.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT HYDRAULIC AND PNEUMATIC POWER TECHNOLOGY--The student will be able to:

10.01 Identify and define key terms, categories, and parts of hydraulic and pneumatic power technology.
10.02 Describe the operating theory and principles of hydraulic and pneumatic power technology.
10.03 Explain the uses and applications of hydraulic and pneumatic power systems.
10.04 Identify industries that produce and use hydraulic and pneumatic power systems.
10.05 Describe the energy sources for hydraulic and pneumatic power systems.
10.06 Perform technical skills in building, assembling, maintaining, or operating hydraulic and pneumatic power systems.

11.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ELECTRIC POWER TECHNOLOGY--The student will be able to:

11.01 Identify and define the key terms, categories, and parts of electric power technology.
11.02 Describe the operating theory and principles of electric power systems.
11.03 Explain the uses and applications of electric power systems.
11.04 Identify industries that produce and use electric power systems.
11.05 Describe energy and fuel sources for electric power systems.
11.06 Perform technical skills in building, assembling, maintaining, or operating an electric power system.

12.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT JET ENGINE POWER TECHNOLOGY--The student will be able to:

12.01 Identify and define key terms, categories, and parts of jet engine power technology.
12.02 Describe the operating theory and principles of jet engine power technology.
12.03 Explain the uses and applications of jet engines.
12.04 Identify industries that produce and use jet engines.
12.05 Describe energy and fuel sources for jet engines.
12.06 Perform technical skills in building, assembling, maintaining, or operating jet engines.

13.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ROCKET ENGINE POWER TECHNOLOGY--The student will be able to:

- 13.01 Identify and define key terms, categories, and parts of rocket engine power technology.
- 13.02 Describe the operating theory and principles of rocket engine power technology.
- 13.03 Explain the uses and applications of rocket engines.
- 13.04 Identify industries that produce and use rocket engines.
- 13.05 Describe energy and fuel sources for rocket engines.
- 13.06 Perform technical skills in building, assembling, maintaining, or operating rocket engines.

14.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT SOLAR CELLS AND OTHER FUEL CELLS--The student will be able to:

- 14.01 Identify and define key terms, categories, and parts of solar cell and fuel cell power technology.
- 14.02 Describe the operating theory and principles of solar cell and fuel cell power technology.
- 14.03 Explain the uses and applications of solar cell and fuel cell power technology.
- 14.04 Identify the industries that produce and use solar cell and fuel cell power systems.
- 14.05 Describe the energy and fuel sources for solar cell and fuel cell power systems.
- 14.06 Perform technical skills in building, assembling, maintaining, or operating solar cell or fuel cell systems.

15.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT NUCLEAR POWER TECHNOLOGY--The student will be able to:

- 15.01 Identify and define the key terms, categories, and parts of nuclear power technology.
- 15.02 Describe the operating theory and principles of nuclear power systems.
- 15.03 Explain the uses and applications of nuclear power systems.
- 15.04 Identify industries that produce and use nuclear power systems.
- 15.05 Describe energy and fuel sources for nuclear power systems.
- 15.06 Perform technical skills in building, assembling, maintaining, or operating a simulated or real nuclear power system.

16.0 PERFORM ADVANCED-STUDY AND TECHNICAL SKILLS RELATED TO ENERGY AND POWER TECHNOLOGY--The student will be able to:

- 16.01 Select an individual or group project in cooperation with the teacher.
- 16.02 Develop a written plan of work to carry out the project.
- 16.03 Show evidence of technical study in support of the project.
- 16.04 Perform skills related to the project.
- 16.05 Complete the project as planned.

17.0 OPERATE A COMPUTER UTILIZING A PROGRAM RELATED TO ENERGY AND POWER--The student will be able to:

- 17.01 Collect or produce data on energy and power through the operation of a computer.

18.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT POWERED TRANSPORTATION SYSTEMS--The student will be able to:

- 18.01 Identify and define key terms, categories, and parts of land, water, air, and space transportation systems.
- 18.02 Describe the theories and operating principles of land, water, air, and space transportation.
- 18.03 Explain the uses and applications of land, water, air and space transportation vehicles.
- 18.04 Identify industries that produce and use land, water, air, and space transportation vehicles.
- 18.05 Describe the energy and power systems used in land, water, air, and space vehicles.
- 18.06 Perform technical skills in building, assembling, servicing, or operating a complete transportation vehicle.

19.0 MEASURE AND REPORT THE POWER AND EFFICIENCY OF POWER PRODUCING SYSTEMS--The student will be able to:

19.01 Measure the power and efficiency of a mechanical system.
19.02 Measure the power and efficiency of a fluid system.
19.03 Measure the power and efficiency of an electrical system.
19.04 Measure the power and efficiency of a thermal system.

20.0 CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON AN INDUSTRIAL MATERIAL OR PROCESS--The student will be able to:

20.01 Identify a problem.
20.02 State a need to research the problem.
20.03 Form a hypothesis about the problem.
20.04 Plan the procedures for researching the problem.
20.05 Conduct the research following the planned procedures.
20.06 Present the research findings in a seminar.
20.07 State conclusions based on the research findings.

STUDENT PERFORMANCE STANDARDS | EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts | COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Energy and Power | PROGRAM NUMBER: 8601200

COURSE TITLE: Introduction to Energy and Power | COURSE NUMBER: 8601210

COURSE DESCRIPTION:

This course provides students with an introduction to the knowledge, human relations, and technical skills of energy and power technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE ENERGY AND POWER LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safety standards.
- 01.06 Safely use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 02.02 Participate a an effective team member.
- 02.03 Follow oral and written instructions.
- 02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 03.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 03.02 Apply basic mathematical skills while completing selected technological assignments.
- 03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 04.01 Define terms related to computer parts and usage.
- 04.02 List ways in which computers are used in energy and power technology.
- 04.03 Discuss advantages and disadvantages in the use of computers.
- 04.04 Demonstrate the application of a computer.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 05.01 Define entrepreneurship.
- 05.02 Describe the importance of entrepreneurship to the American economy.
- 05.03 List the advantages and disadvantages of business ownership.
- 05.04 Identify the risks involved in ownership of a business.
- 05.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 05.06 Identify the business skills needed to operate a small business efficiently and effectively.

06.0 DESCRIBE SOURCES OF ENERGY--The student will be able to:

- 06.01 Describe sources of thermal energy.
- 06.02 Describe sources of radiant energy.
- 06.03 Describe sources of nuclear energy.
- 06.04 Describe sources of chemical energy.
- 06.05 Describe sources of electrical energy.
- 06.06 Describe sources of mechanical energy.
- 06.07 Describe sources of fluid energy.

07.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT STEAM POWER TECHNOLOGY--The student will be able to:

- 07.01 Identify and define the key terms, categories, and parts of steam power technology.
- 07.02 Describe the operating theory and principles of steam engines and steam turbines.
- 07.03 Explain the uses and applications of steam power engines and systems.
- 07.04 Identify industries that produce and use steam power systems.
- 07.05 Describe energy and fuel sources for steam power operations.
- 07.06 Perform technical skills in building, assembling, maintaining, or operating a steam power system.

08.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT DIESEL ENGINE POWER TECHNOLOGY--The student will be able to:

- 08.01 Identify and define key terms, categories, and parts of diesel engine power technology.
- 08.02 Describe the operating theory and principles of diesel engine power technology.
- 08.03 Explain the uses and applications of diesel engines.
- 08.04 Identify industries that produce and use diesel engines.
- 08.05 Describe energy and fuel sources for diesel engines.
- 08.06 Perform technical skills in building, assembling, maintaining, or operating diesel engines.

09.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT INTERNAL COMBUSTION POWER TECHNOLOGY--The student will be able to:

- 09.01 Identify and define the key terms, categories, and parts of gasoline engine internal combustion technology.
- 09.02 Describe the operating theory and principles of internal combustion gasoline engines.
- 09.03 Explain the uses and applications of internal combustion gasoline engines.
- 09.04 Identify industries that produce and use internal combustion gasoline engines.
- 09.05 Describe energy and fuel sources for internal combustion gasoline engines.
- 09.06 Perform technical skills in building, assembling, maintaining, or operating internal combustion gasoline engines.

STUDENT PERFORMANCE STANDARDS — EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts — COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Energy and Power — PROGRAM NUMBER: 8601200

COURSE TITLE: Intermediate Energy and Power — COURSE NUMBER: 8601220

COURSE DESCRIPTION:

This course provides students with an expanded study and application of the knowledge, human relations, and technical skills of energy and power technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE ENERGY AND POWER LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safety standards.
- 01.06 Safely use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 02.02 Participate as a effective team member.
- 02.03 Follow oral and written instruction.
- 02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 03.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 03.02 Apply basic mathematical skills while completing selected technological assignments.
- 03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 04.01 Define terms related to computer parts and usage.
- 04.02 List ways in which computers are used in energy and power technology.
- 04.03 Discuss advantages and disadvantages in the use of computers.
- 04.04 Demonstrate the application of a computer.

10.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT HYDRAULIC AND PNEUMATIC POWER TECHNOLOGY--The student will be able to:

- 10.01 Identify and define key terms, categories, and parts of hydraulic and pneumatic power technology.
- 10.02 Describe the operating theory and principles of hydraulic and pneumatic power technology.
- 10.03 Explain the uses and applications of hydraulic and pneumatic power systems.
- 10.04 Identify industries that produce and use hydraulic and pneumatic power systems.
- 10.05 Describe the energy sources for hydraulic and pneumatic power systems.
- 10.06 Perform technical skills in building, assembling, maintaining, or operating hydraulic and pneumatic power systems.

11.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ELECTRIC POWER TECHNOLOGY--The student will be able to:

- 11.01 Identify and define the key terms, categories, and parts of electric power technology.
- 11.02 Describe the operating theory and principles of electric power systems.
- 11.03 Explain the uses and applications of electric power systems.
- 11.04 Identify industries that produce and use electric power systems.
- 11.05 Describe energy and fuel sources for electric power systems.
- 11.06 Perform technical skills in building, assembling, maintaining, or operating an electric power system.

12.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT JET ENGINE POWER TECHNOLOGY--The student will be able to:

- 12.01 Identify and define key terms, categories, and parts of jet engine power technology.
- 12.02 Describe the operating theory and principles of jet engine power technology.
- 12.03 Explain the uses and applications of jet engines.
- 12.04 Identify industries that produce and use jet engines.
- 12.05 Describe energy and fuel sources for jet engines.
- 12.06 Perform technical skills in building, assembling, maintaining, or operating jet engines.

13.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT ROCKET ENGINE POWER TECHNOLOGY--The student will be able to:

- 13.01 Identify and define key terms, categories, and parts of rocket engine power technology.
- 13.02 Describe the operating theory and principles of rocket engine power technology.
- 13.03 Explain the uses and applications of rocket engines.
- 13.04 Identify industries that produce and use rocket engines.
- 13.05 Describe energy and fuel sources for rocket engines.
- 13.06 Perform technical skills in building, assembling, maintaining, or operating rocket engines.

14.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT SOLAR CELLS AND OTHER FUEL CELLS--The student will be able to:

- 14.01 Identify and define key terms, categories, and parts of solar cell and fuel cell power technology.
- 14.02 Describe the operating theory and principles of solar cell and fuel cell power technology.
- 14.03 Explain the uses and applications of solar cell and fuel cell power technology.
- 14.04 Identify the industries that produce and use solar cell and fuel cell power systems.
- 14.05 Describe the energy and fuel sources for solar cell and fuel cell power systems.
- 14.06 Perform technical skills in building, assembling, maintaining, or operating solar cell or fuel cell systems.

15.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT NUCLEAR POWER TECHNOLOGY--The student will be able to:

- 15.01 Identify and define the key terms, categories, and parts of nuclear power technology.
- 15.02 Describe the operating theory and principles of nuclear power systems.
- 15.03 Explain the uses and applications of nuclear power systems.
- 15.04 Identify industries that produce and use nuclear power systems.
- 15.05 Describe energy and fuel sources for nuclear power systems.
- 15.06 Perform technical skills in building, assembling, maintaining, or operating a simulated or real nuclear power system.

STUDENT PERFORMANCE STANDARDS — EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts — COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Energy and Power — PROGRAM NUMBER: 8601200

COURSE TITLE: Energy and Power - Individual Study — COURSE NUMBER: 8601230

COURSE DESCRIPTION:

This course provides students with an advanced study and application of the knowledge, human relations, and technical skills of energy and power technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE ENERGY AND POWER LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safety standards.
- 01.06 Safely use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 02.02 Participate as an effective team member.
- 02.03 Follow oral and written instructions.
- 02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 03.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 03.02 Apply basic mathematical skills while completing selected technological assignments.
- 03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 04.01 Define terms related to computer parts and usage.
- 04.02 List ways in which computers are used in energy and power technology.
- 04.03 Discuss advantages and disadvantages in the use of computers.
- 04.04 Demonstrate the application of a computer.

16.0 PERFORM ADVANCED STUDY AND TECHNICAL SKILLS RELATED TO ENERGY AND POWER TECHNOLOGY--The student will be able to:

- 16.01 Select an individual or group project in cooperation with the teacher.
- 16.02 Develop a written plan of work to carry out the project.
- 16.03 Show evidence of technical study in support of the project.
- 16.04 Perform skills related to the project.
- 16.05 Complete the project as planned.

17.0 OPERATE A COMPUTER UTILIZING A PROGRAM RELATED TO ENERGY AND POWER--The student will be able to:

- 17.01 Collect or produce data on energy and power through the operation of a computer.

18.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS ABOUT POWERED TRANSPORTATION SYSTEMS--The student will be able to:

- 18.01 Identify and define key terms, categories, and parts of land, water, air, and space transportation systems.
- 18.02 Describe the theories and operating principles of land, water, air, and space transportation.
- 18.03 Explain the uses and applications of land, water, air, and space transportation vehicles.
- 18.04 Identify industries that produce and use land, water, air, and space transportation vehicles.
- 18.05 Describe the energy and power systems used in land, water, air, and space vehicles.
- 18.06 Perform technical skills in building, assembling, servicing, or operating a complete transportation vehicle.

19.0 MEASURE AND REPORT THE POWER AND EFFICIENCY OF POWER PRODUCING SYSTEMS--The student will be able to:

- 19.01 Measure the power and efficiency of a mechanical system.
- 19.02 Measure the power and efficiency of a fluid system.
- 19.03 Measure the power and efficiency of an electrical system.
- 19.04 Measure the power and efficiency of a thermal system.

20.0 CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON AN INDUSTRIAL MATERIAL OR PROCESS--The student will be able to:

20.01 Identify a problem.
20.02 State a need to research the problem.
20.03 Form a hypothesis about the problem.
20.04 Plan the procedures for researching the problem.
20.05 Conduct the research following the planned procedures.
20.06 Present the research findings in a seminar.
20.07 State conclusions based on the research findings.

CURRICULUM FRAMEWORK — PROGRAM AREA: Industrial Arts

FLORIDA DEPARTMENT OF EDUCATION — EFFECTIVE DATE: July, 1987

PROGRAM TITLE: Pretechnical Graphic Arts

CODE NUMBER: Secondary 8601000 — Postsecondary _____

Florida CIP IA21.010600

SECONDARY SCHOOL CREDITS	COLLEGE CREDITS	POSTSECONDARY ADULT VOCATIONAL CREDITS
3	_____	_____

APPLICABLE LEVEL(S): _____ 7-9 x 9-12 _____ Postsecondary Adult Vocational

_____ Postsecondary Vocational x Other 21

CERTIFICATION COVERAGE: INDUS ARTS 4 @ 6, GEN SHOP @ 4, GRAPHIC ARTS 4, PRINTING 7

I. MAJOR CONCEPTS/CONTENT: The purpose of this program is to provide students with a foundation of knowledge and technically oriented experiences in the study of graphic arts technology.

The content includes, but is not limited to, a study of the processes, uses, and technical skills of graphic arts technology. The content and activities also include the study of entrepreneurship, safety, and leadership skills.

Listed below are the courses that make up this program at the secondary level.

8601010 Introduction to Graphic Arts
8601020 Intermediate Graphic Arts
8601030 Graphic Arts -- Individual Study

II. LABORATORY ACTIVITIES: Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the tools and materials appropriate to the course content.

III. SPECIAL NOTE: The Florida American Industrial Arts Student Association is the appropriate vocational student organization for providing leadership training experiences and for reinforcing specific vocational skills. When provided, these activities are considered an integral part of this instructional program.

IV. INTENDED OUTCOMES: After successfully completing this program, the student will be able to:

01. Use proper and safe procedures in the graphic arts technology laboratory.
02. Demonstrate positive human relations and leadership skills.
03. Apply basic skills in English, mathematics, and science appropriate to technological content and learning activities.
04. Demonstrate computer literacy and application.
05. Demonstrate an understanding of entrepreneurship.
06. Express a technical knowledge and understanding about major printing processes.
07. Describe the properties and specifications of printing materials.
08. Demonstrate technical knowledge and skills in the preparation of art and copy for printing reproduction.
09. Demonstrate technical knowledge and skills in graphic arts process photography.
10. Demonstrate technical knowledge and skills in the processes of platemaking.
11. Produce printed copies through the operation of a lithographic offset press.
12. Demonstrate technical knowledge and skills in screen process printing.
13. Demonstrate technical knowledge and skills in binding and finishing processes.
14. Use technical knowledge and skills in continuous tone photography.

15. Apply technical knowledge and skills in the processes of multi-colored printing.
16. Perform advanced study and technical skills related to graphic arts technology.
17. Operate a computer utilizing a program related to graphic arts technology.
18. Demonstrate technical knowledge and skills in advanced printing procedures.
19. Demonstrate technical knowledge and skills in continuous tone photography.
20. Conduct a research and experimentation project in graphic arts technology.

STUDENT PERFORMANCE STANDARDS EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts SECONDARY NUMBER: 8601000

PROGRAM TITLE: Pretechnical Graphic Arts

01.0 USE PROPER AND SAFE PROCEDURES IN THE GRAPHIC ARTS TECHNOLOGY LABORATORY--The student will be able to:

01.01 Follow lab safety rules and procedures.
01.02 Demonstrate good housekeeping at work station and within total lab.
01.03 Conduct lab activities and equipment operations in a safe manner.
01.04 Exercise care and respect for all tools, equipment, and materials.
01.05 Identify OSHA color coding safety standards.
01.06 Safely use hand tools and power equipment.
01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
02.02 Participate as an effective team member.
02.03 Follow oral and written instructions.
02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

03.01 Apply basic English skills while completing selected written and verbal technological assignments.
03.02 Apply basic mathematical skills while completing selected technological assignments.
03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

04.01 Define terms related to computer parts and usage.
04.02 List ways in which computers are used in graphic arts technology.
04.03 Discuss advantages and disadvantages in the use of computers.
04.04 Demonstrate the application of a computer.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

05.01 Define entrepreneurship.
05.02 Describe the importance of entrepreneurship to the American economy.
05.03 List the advantages and disadvantages of business ownership.
05.04 Identify the risks involved in ownership of a business.
05.05 Identify the necessary personal characteristics of a successful entrepreneur.
05.06 Identify the business skills needed to operate a small business efficiently and effectively.

06.0 EXPRESS A TECHNICAL KNOWLEDGE AND UNDERSTANDING ABOUT MAJOR PRINTING PROCESSES--The student will be able to:

06.01 Explain the processes of relief, gravure, screen, lithographic, electrostatic, and projection printing.
06.02 Explain the difference between printing and duplicating processes.
06.03 Apply the different printing processes in the production of printed projects.

07.0 DESCRIBE THE PROPERTIES AND SPECIFICATIONS OF PRINTING MATERIALS--The student will be able to:

07.01 Describe the types, sizes, quantities and properties of paper.
07.02 Explain the different ingredients and purposes of inks.
07.03 Describe the chemical properties and precautions of graphic arts solvents.
07.04 Describe the manufacturing technology and process in making paper and inks.
07.05 Explain the chemistry and specifications of photographic films and papers.

08.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE PREPARATION OF ART AND COPY FOR PRINTING REPRODUCTION--The student will be able to:

08.01 Explain the principles of graphic arts layout and design.
08.02 Express an understanding of printers' measurements, proofreaders' marks, and type styles.
08.03 Demonstrate the processes of cold type composition, phototypesetting, and computer generated type.
08.04 Explain the processes of copyfitting, cropping, and registering.
08.05 Apply the standard procedures and techniques in generating copy or paste-ups for printing reproduction.

09.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN GRAPHIC ARTS PROCESS PHOTOGRAPHY--The student will be able to:

09.01 Identify different styles of process cameras.
09.02 Describe specifications and properties of graphic arts films, screens, and chemicals.
09.03 Display a knowledge of darkroom lighting and ventilation.
09.04 Apply the procedures for camera set up, exposing, film processing, correcting problems, and clean-up.
09.05 Produce a quality line and halftone negative.

10.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE PROCESSES OF PLATEMAKING--The student will be able to:

10.01 Describe the processes for making letterpress and gravure plates.
10.02 Express knowledge about the types, styles, and properties of offset lithographic plates.
10.03 Explain the photomechanics of a photo offset plate.
10.04 Apply the technical procedures for stripping a flat, generating direct and photo offset plates, identifying and correcting problems, and preserving and storing plates.
10.05 Produce a quality offset metal plate.

11.0 PRODUCE PRINTED COPIES THROUGH THE OPERATION OF A LITHOGRAPHIC OFFSET PRESS--The student will be able to:

11.01 Identify the major systems and functions of an offset press.
11.02 Perform the standard procedure for operating an offset press, including makeready, operating procedures, identifying and correcting problems, and clean-up.
11.03 Produce a quality offset project.

12.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN SCREEN PROCESS PRINTING--The student will be able to:

12.01 Describe the types of inks and screens for screen process printing.
12.02 Explain the substrate surfaces and materials commonly printed on through the screen printing process.
12.03 Describe the standard procedures for screen printing, including screen preparation, operating procedures, identifying and correcting problems, and clean-up.
12.04 Describe stencil making processes.
12.05 Produce a single color screen print.

13.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN BINDING AND FINISHING OPERATIONS--The student will be able to:

13.01 Identify the parts of a case bound book.
13.02 Explain die cutting.
13.03 Describe the processes of scoring, folding, gathering, and collating.
13.04 Describe the processes of hot stamping, laminating, perforating, punching, drilling, and thermography.
13.05 Demonstrate the proper and safe use of a paper cutter and trimmer.
13.06 Make a bound and finished printed product using the proper technical skills.

14.0 USE TECHNICAL SKILLS AND KNOWLEDGE IN CONTINUOUS TONE PHOTOGRAPHY--The student will be able to:

14.01 Describe the standard procedure for making a continuous tone negative including camera operation, processing film, identifying

and correcting problems, and clean-up.
14.02 Describe the standard procedure for making a continuous tone print, including darkroom operation, printing and processing, identifying and correcting problems, and clean-up.
14.03 Produce a quality negative
14.04 Produce a quality print.

15.0 APPLY TECHNICAL KNOWLEDGE AND SKILLS IN THE PROCESSES OF MULTI-COLOR PRINTING--The student will be able to:

15.01 Design and layout copy for multi-color registration and printing.
15.02 Use the proper technical skills in the layout, preparation, production, and finishing of a multi-colored offset printing job.
15.03 Use the proper technical skills in the layout, preparation, production, and finishing of a multi-colored screen process printed job.

16.0 PERFORM ADVANCED STUDY AND TECHNICAL SKILLS RELATED TO GRAPHIC ARTS TECHNOLOGY--The student will be able to:

16.01 Select an individual or group project in cooperation with the teacher.
16.02 Develop a written plan of work to carry out the project.
16.03 Show evidence of technical study in support of the project.
16.04 Perform skills related to the project.
16.05 Complete the project as planned.

17.0 OPERATE A COMPUTER UTILIZING A PROGRAM RELATED TO GRAPHIC ARTS TECHNOLOGY--The student will be able to:

17.01 Collect or produce data on graphic arts technology through the operation of a computer.

18.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN ADVANCED PRINTING PROCEDURES--The student will be able to:

18.01 Explain the photographic and lithographic theories and technical skills of color separation printing.
18.02 Explain the screen printing procedures for special materials and for different shaped objects.
18.03 Perform or set up a technical display of the color separation process.
18.04 Print a screen process job on a special shape, surface, or for a special purpose such as printed circuitry.
18.05 Describe the standard procedures for operating the video camera and produce a quality video product.

19.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN CONTINUOUS TONE PHOTOGRAPHY--The student will be able to:

19.01 Describe the theory and technical processes of producing colored prints and colored slides.
19.02 Describe the theory and technical practices of special effects photography.
19.03 Describe the theory and technical applications of high speed photography.
19.04 Produce a photographic study using the technical skills of color, special effects, or high speed photography.

20.0 CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON A GRAPHIC ARTS MATERIAL OR PROCESS--The student will be able to:

20.01 Identify a problem.
20.02 State a need to research the problem.
20.03 Form a hypothesis about the problem.
20.04 Plan the procedures for researching the problem.
20.05 Conduce the research following the planned procedures.
20.06 Present the research findings in a seminar.
20.07 State conclusions based on the research findings.

STUDENT PERFORMANCE STANDARDS — EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts — COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Graphic Arts — PROGRAM NUMBER: 8601000

COURSE TITLE: Introduction to Graphic Arts — COURSE NUMBER: 8601010

COURSE DESCRIPTION:

This course provides students with an introduction to the knowledge, human relations and technical skills of graphic arts technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE GRAPHIC ARTS TECHNOLOGY LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safety standards.
- 01.06 Safely use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 02.02 Participate as an effective team member.
- 02.03 Follow oral and written instructions.
- 02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 03.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 03.02 Apply basic mathematical skills while completing selected technological assignments.
- 03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 04.01 Define terms related to computer parts and usage.
- 04.02 List ways in which computers are used in graphic arts technology.
- 04.03 Discuss advantages and disadvantages in the use of computers.
- 04.04 Demonstrate the application of a computer.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 05.01 Define entrepreneurship.
- 05.02 Describe the importance of entrepreneurship to the American economy.
- 05.03 List the advantages and disadvantages of business ownership.
- 05.04 Identify the risks involved in ownership of a business.
- 05.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 05.06 Identify the business skills needed to operate a small business efficiently and effectively.

06.0 EXPRESS A TECHNICAL KNOWLEDGE AND UNDERSTANDING ABOUT MAJOR PRINTING PROCESSES--The student will be able to:

- 06.01 Explain the processes of relief, gravure, screen, lithographic, electrostatic, and projection printing.
- 06.02 Explain the difference between printing and duplicating processes.
- 06.03 Apply the different printing processes in the production of printed projects.

07.0 DESCRIBE THE PROPERTIES AND SPECIFICATIONS OF PRINTING MATERIALS--The student will be able to:

- 07.01 Describe the types, sizes, quantities and properties of paper.
- 07.02 Explain the different ingredients and purposes of inks.

07.03 Describe the chemical properties and precautions of graphic arts solvents.
07.04 Describe the manufacturing technology and process in making paper and inks.
07.05 Explain the chemistry and specifications of photographic films and papers.

08.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE PREPARATION OF ART AND COPY FOR PRINTING REPRODUCTION--The student will be able to:

08.01 Explain the principles of graphic arts layout and design.
08.02 Express an understanding of printers' measurements, proofreaders' marks, and type styles.
08.03 Demonstrate the processes of cold type composition, phototypesetting, and computer generated type.
08.04 Explain the processes of copyfitting, cropping, and registering.
08.05 Apply the standard procedures and techniques in generating copy or paste-ups for printing reproduction.

09.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN GRAPHIC ARTS PROCESS PHOTOGRAPHY--The student will be able to:

09.01 Identify different styles of process cameras.
09.02 Describe specifications and properties of graphic arts films, screens, and chemicals.
09.03 Display a knowledge of darkroom lighting and ventilation.
09.04 Apply the procedures for camera set up, exposing, film processing, correcting problems, and clean-up.
09.05 Produce a quality line and halftone negative.

10.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN THE PROCESSES OF PLATEMAKING--The student will be able to:

10.01 Describe the processes for making letterpress and gravure plates.
10.02 Express knowledge about the types, styles, and properties of offset lithographic plates.
10.03 Explain the photomechanics of a photo offset plate.
10.04 Apply the technical procedures for stripping a flat, generating direct and photo offset plates, identifying and correcting problems, and preserving and storing plates.
10.05 Produce a quality offset metal plate.

11.0 PRODUCE PRINTED COPIES THROUGH THE OPERATION OF A LITHOGRAPHIC OFFSET PRESS--The student will be able to:

11.01 Identify the major systems and functions of an offset press.
11.02 Perform the standard procedure for operating an offset press, including makeready, operating procedures, identifying and correcting problems, and clean-up.
11.03 Produce a quality offset project.

12.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN SCREEN PROCESS PRINTING--The student will be able to:

12.01 Describe the types of inks and screens for screen process printing.
12.02 Explain the substrate surfaces and materials commonly printed on through the screen printing process.
12.03 Describe the standard procedures for screen printing, including screen preparation, operating procedures, identifying and correcting problems, and clean-up.
12.04 Describe stencil making processes.
12.05 Produce a single color screen print.

STUDENT PERFORMANCE STANDARDS | EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts | COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Graphic Arts | PROGRAM NUMBER: 8601000

COURSE TITLE: Intermediate Graphic Arts | COURSE NUMBER: 8601020

COURSE DESCRIPTION:

This course provides students with an expanded study and application of the knowledge, human relations, and technical skills of graphic arts technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE GRAPHIC ARTS TECHNOLOGY LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safety standards.
- 01.06 Safely use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform a role in a student personnel system or in the Florida American Industrial Arts Student Association.
- 02.02 Participate as an effective team member.
- 02.03 Follow oral and written instructions.
- 02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 03.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 03.02 Apply basic mathematical skills while completing selected technological assignments.
- 03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 04.01 Define terms related to computer parts and usage.
- 04.02 List ways in which computers are used in graphic arts technology.
- 04.03 Discuss advantages and disadvantages in the use of computers.
- 04.04 Demonstrate the application of a computer.

13.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN BINDING AND FINISHING OPERATIONS--The student will be able to:

- 13.01 Identify the parts of a case bound book.
- 13.02 Explain die cutting.
- 13.03 Describe the processes of scoring, folding, gathering, and collating.
- 13.04 Describe the processes of hot stamping, laminating, perforating, punching, and dulling.
- 13.05 Demonstrate the proper and safe use of a paper cutter and trimmer.
- 13.06 Make a bound and finished printed product using the proper technical skills.

14.0 USE TECHNICAL SKILLS AND KNOWLEDGE IN CONTINUOUS TONE PHOTOGRAPHY--The student will be able to:

- 14.01 Describe the standard procedure for making continuous tone negative including camera operation, processing film, identifying and correcting problems, and clean-up.
- 14.02 Describe the standard procedure for making a continuous tone print, including darkroom operation, printing and processing, identifying and correcting problems, and clean-up.
- 14.03 Produce a quality negative
- 14.04 Produce a quality print.

15.0 APPLY TECHNICAL KNOWLEDGE AND SKILLS IN THE PROCESSES OF MULTI-COLOR PRINTING--The student will be able to:

15.01 Design and layout copy for multi-color registration and printing.
15.02 Use the proper technical skills in the layout, preparation, production, and finishing of a multi-colored offset printing job.
15.03 Use the proper technical skills in the layout, preparation, production, and finishing of a multi-colored screen process printed job.

STUDENT PERFORMANCE STANDARDS — EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts — COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Graphic Arts — PROGRAM NUMBER: 8601000

COURSE TITLE: Graphic Arts - Individual Study — COURSE NUMBER: 8601030

COURSE DESCRIPTION:

This course provides students with an advanced study and application of the knowledge, human relations, and technical skills of graphic arts technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE GRAPHIC ARTS TECHNOLOGY LABORATORY--The student will be able to:

01.01 Follow lab safety rules and procedures.
01.02 Demonstrate good housekeeping at work station and within total lab.
01.03 Conduct lab activities and equipment operations in a safe manner.
01.04 Exercise care and respect for all tools, equipment, and materials.
01.05 Identify OSHA color coding safety standards.
01.06 Safely use hand tools and power equipment.
01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

02.01 Perform a role in a student personnel system or in the Florida American Industrial Arts Student Association.
02.02 Participate as an effective team member.
02.03 Follow oral and written instructions.
02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

03.01 Apply basic English skills while completing selected written and verbal technological assignments.
03.02 Apply basic mathematical skills while completing selected technological assignments.
03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

04.01 Define terms related to computer parts and usage.
04.02 List ways in which computers are used in graphic arts technology.
04.03 Discuss advantages and disadvantages in the use of computers.
04.04 Demonstrate the application of a computer.

16.0 PERFORM ADVANCED STUDY AND TECHNICAL SKILLS RELATED TO GRAPHIC ARTS TECHNOLOGY--The student will be able to:

16.01 Select an individual or group project in cooperation with the teacher.
16.02 Develop a written plan of work to carry out the project.
16.03 Show evidence of technical study in support of the project.
16.04 Perform skills related to the project.
16.05 Complete the project as planned.

17.0 OPERATE A COMPUTER UTILIZING A PROGRAM RELATED TO GRAPHIC ARTS TECHNOLOGY--The student will be able to:

17.01 Collect or produce data on graphic arts technology through the operation of a computer.

18.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN ADVANCED PRINTING PROCEDURES--The student will be able to:

18.01 Explain the photographic and lithographic theories and technical skills of color separation printing.
18.02 Explain the screen printing procedures for special materials and for different shaped objects.
18.03 Perform or set up a technical display of the color separation process.
18.04 Print a screen process job on a special shape, surface, or for a special purpose such as printed circuitry.
18.05 Describe the standard procedures for operating the video camera and produce a quality video product.

19.0 DEMONSTRATE TECHNICAL KNOWLEDGE AND SKILLS IN CONTINUOUS TONE PHOTOGRAPHY--The student will be able to:

19.01 Describe the theory and technical processes of producing colored prints and colored slides.
19.02 Describe the theory and technical practices of special effects photography.
19.03 Describe the theory and technical applications of high speed photography.
19.04 Produce a photographic study using the technical skills of color, special effects, or high speed photography.

20.0 CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON A GRAPHIC ARTS MATERIAL OR PROCESS--The student will be able to:

20.01 Identify a problem.
20.02 State a need to research the problem.
20.03 Form a hypothesis about the problem.
20.04 Plan the procedures for researching the problem.
20.05 Conduce the research following the planned procedures.
20.06 Present the research findings in a seminar.
20.07 State conclusions based on the research findings.

CURRICULUM FRAMEWORK

FLORIDA DEPARTMENT OF EDUCATION

PROGRAM AREA: Industrial Arts

EFFECTIVE DATE: July, 1987

PROGRAM TITLE: Pretechnical Materials and Processes

CODE NUMBER: Secondary 8601100 Postsecondary _____

Florida CIP 1A21.010700

SECONDARY SCHOOL CREDITS 3 COLLEGE CREDITS _____ POSTSECONDARY ADULT VOCATIONAL CREDITS _____

APPLICABLE LEVEL(S): _____ 7-9 x 9-12 _____ Postsecondary Adult Vocational

_____ Postsecondary Vocational x Other 21

CERTIFICATION COVERAGE: INDUS ARTS 4 @ 6
METALS 4
WOODWORK 4
GEN SHOP @ 4

I. MAJOR CONCEPTS/CONTENT: The purpose of this program is to provide student with a foundation of knowledge and technically oriented experiences in the study of the technology of industrial materials and processes.

The content includes, but is not limited to, a study of the preprocessing, processing, and postprocessing of wood, metal, plastic, composite, and other industrial materials. The content and activities will also include the study of entrepreneurship, safety, and leadership skills.

Listed below are the courses that make up this program at the secondary level.

8601110 Introduction to Materials and Processes
8601120 Intermediate Materials and Processes
8601130 Materials and Processes - Individual Study

II. LABORATORY ACTIVITIES: Instruction and learning activities are provided in a laboratory setting using hands-on experiences with the tools and materials appropriate to the course content.

III. SPECIAL NOTE: The Florida American Industrial Arts Student Association is the appropriate vocational student organization for providing leadership training experiences and for reinforcing specific vocational skills. When provided, these activities are considered an integral part of this instructional program.

IV. INTENDED OUTCOMES: After successfully completing this program, the student will be able to:

01. Use proper and safe procedures in the materials and processes laboratory.
02. Demonstrate positive human relations and leadership skills.
03. Apply basic skills in English, mathematics, and science appropriate to technological content and learning activities.
04. Demonstrate computer literacy and application.
05. Demonstrate an understanding of entrepreneurship.
06. Define the processes related to industrial materials.
07. Describe preprocessing activities and practices of industrial materials.
08. Describe processing technologies and practices of industrial materials.
09. Describe postprocessing activities and practices of industrial materials.
10. Perform industrial materials preprocessing skills.
11. Perform technical processing skills with wood materials.
12. Perform technical processing skills with metal materials.
13. Perform technical processing skills with plastic materials.
14. Perform technical processing skills with other industrial materials such as composite materials, synthetic materials, fiberglass, glass, ceramics, cement, paper, rubber, petroleum, and other industrial materials.
15. Perform industrial materials postprocessing skills.

16. Perform advanced study and technical skills related to industrial materials and processes.
17. Operate a computer utilizing a program related to industrial materials.
18. Perform materials testing skills.
19. Perform a materials processing operation using a CNC (computer numerical controlled) machine.
20. Conduct a research and experimentation project on an industrial material or process.

STUDENT PERFORMANCE STANDARDS EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts SECONDARY NUMBER: 8601100

PROGRAM TITLE: Pretechnical Materials and Processes

01.0 USE PROPER AND SAFE PROCEDURES IN THE MATERIALS AND PROCESSES LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safety standards.
- 01.06 Safely use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 02.02 Participate as an effective team member.
- 02.03 Follow oral and written instructions.
- 02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 03.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 03.02 Apply basic mathematical skills while completing selected technological assignments.
- 03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 04.01 Define terms related to computer parts and usage.
- 04.02 List ways in which computers are used in industrial materials and processes technology.
- 04.03 Discuss advantages and disadvantages in the use of computers.
- 04.04 Demonstrate the application of a computer.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 05.01 Define entrepreneurship.
- 05.02 Describe the importance of entrepreneurship to the American economy.
- 05.03 List the advantages and disadvantages of business ownership.
- 05.04 Identify the risks involved in ownership of a business.
- 05.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 05.06 Identify the business skills needed to operate a small business efficiently and effectively.

06.0 DEFINE THE PROCESSES RELATED TO INDUSTRIAL MATERIALS--The student will be able to:

- 06.01 Define "preprocessing."
- 06.02 Define "processing."
- 06.03 Define "postprocessing."

07.0 DESCRIBE PREPROCESSING ACTIVITIES AND PRACTICES OF INDUSTRIAL MATERIALS--The student will be able to:

- 07.01 Describe the technical processes of extracting materials from natural resources.
- 07.02 Describe sources of standard stock materials.
- 07.03 Describe processes for transporting industrial materials.
- 07.04 Describe processes for storing industrial materials.
- 07.05 Describe industrial processes for protecting materials.

07.06 Describe precautions in receiving, unpacking, and handling industrial materials.

08.0 DESCRIBE PROCESSING TECHNOLOGIES AND PRACTICES OF INDUSTRIAL MATERIALS--The student will be able to:

08.01 Describe materials separating processes.
08.02 Describe materials forming processes.
08.03 Describe materials combining processes.
08.04 Describe materials conditioning processes.

09.0 DESCRIBE POSTPROCESSING TECHNOLOGIES AND PRACTICES OF INDUSTRIAL MATERIALS--The student will be able to:

09.01 Describe processes for distributing products made of industrial materials.
09.02 Describe processes for installing products made of industrial materials.
09.03 Describe processes for maintaining products made of industrial materials.
09.04 Describe processes for altering products made of industrial materials.
09.05 Describe processes for servicing products made of industrial materials.

10.0 PERFORM INDUSTRIAL MATERIALS PREPROCESSING SKILLS--The student will be able to:

10.01 Locate and order industrial materials.
10.02 Arrange for the appropriate transportation of industrial materials.
10.03 Store and protect industrial materials properly.
10.04 Follow proper precautions in the receiving, unpacking, and handling of industrial materials.

11.0 PERFORM TECHNICAL PROCESSING SKILLS WITH WOOD MATERIALS--The student will be able to:

11.01 Apply the technical processes of separating and forming wood materials.
11.02 Apply the technical processes of conditioning wood materials.
11.03 Apply the technical processes of combining in the fabrication and finishing of a wood product.

12.0 PERFORM TECHNICAL PROCESSING SKILLS WITH METAL MATERIALS--The student will be able to:

12.01 Apply the technical processes of separating and forming metal materials.
12.02 Apply the technical processes of conditioning metal materials.
12.03 Apply the technical processes of combining in the fabrication and finishing of a metal product.

13.0 PERFORM TECHNICAL PROCESSING SKILLS WITH PLASTIC MATERIALS--The student will be able to:

13.01 Apply the technical processes of separating and forming plastic materials.
13.02 Apply the technical processing of conditioning plastic materials.
13.03 Apply the technical processes of combining in the fabrication and finishing of a plastic product.

14.0 PERFORM TECHNICAL PROCESSING SKILLS WITH OTHER INDUSTRIAL MATERIALS SUCH AS COMPOSITE MATERIALS, SYNTHETIC MATERIALS, FIBERGLASS, GLASS, CERAMICS, CEMENT, PAPER, RUBBER, PETROLEUM, AND OTHER INDUSTRIAL MATERIALS--The student will be able to:

14.01 Apply the technical processes of separating and forming other industrial materials.
14.02 Apply the technical processes of conditioning other industrial materials.
14.03 Apply the technical processes of combining in the fabrication and finishing of other industrial materials.

15.0 PERFORM INDUSTRIAL MATERIALS POSTPROCESSING SKILLS--The student will be able to:

15.01 Install a product made of industrial materials.
15.02 Perform technical maintenance on a product made of industrial materials.
15.03 Plan and design a technical alteration in a product made of industrial materials.
15.04 Identify businesses that specialize in the technical service of products made of industrial materials.

16.0 PERFORM ADVANCED STUDY AND TECHNICAL SKILLS RELATED TO INDUSTRIAL MATERIALS AND PROCESSES--The student will be able to:

16.01 Select an individual or group project in cooperation with the teacher.
16.02 Develop a written plan of work to carry out the project.
16.03 Show evidence of technical study in support of the project.
16.04 Perform skills related to the project.
16.05 Complete the project as planned.

17.0 OPERATE A COMPUTER UTILIZING A PROGRAM RELATED TO INDUSTRIAL MATERIALS--The student will be able to:

17.01 Collect or produce data on industrial materials or processes through the operation of a computer.

18.0 PERFORM MATERIALS TESTING SKILLS--The student will be able to:

18.01 Perform technical destructive tests on industrial materials.
18.02 Perform technical nondestructive tests on industrial materials.

19.0 PERFORM A MATERIALS PROCESSING OPERATION USING A CNC (COMPUTER NUMERICAL CONTROLLED) MACHINE--The student will be able to:

19.01 Separate, form, or combine a part or subpart of a project using a CNC machine.
19.02 Interface a CNC machine and a robotic arm to perform an automation process.

20.0 CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON AN INDUSTRIAL MATERIAL OR PROCESS--The student will be able to:

20.01 Identify a problem.
20.02 State a need to research the problem.
20.03 Form a hypothesis about the problem.
20.04 Plan the procedures for researching the problem.
20.05 Conduct the research following the planned procedures.
20.06 Present the research findings in a seminar.
20.07 State conclusions based on the research findings.

STUDENT PERFORMANCE STANDARDS — EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts — COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Materials and Processes — PROGRAM NUMBER: 8601100

COURSE TITLE: Introduction to Materials and Processes — COURSE NUMBER: 8601110

COURSE DESCRIPTION:

This course provides students with an introduction to the knowledge, human relations, and technical skills of industrial materials and processes technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE MATERIALS AND PROCESSES LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safety standards.
- 01.06 Safely use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 02.02 Participate as an effective team member.
- 02.03 Follow oral and written instructions.
- 02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 03.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 03.02 Apply basic mathematical skills while completing selected technological assignments.
- 03.04 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

04.0 DEMONSTRATE COMPUTER LITERACY AND APPLICATION--The student will be able to:

- 04.01 Define terms related to computer parts and usage.
- 04.02 List ways in which computers are used in industrial materials and processes technology.
- 04.03 Discuss advantages and disadvantages in the use of computers.
- 04.04 Demonstrate the application of a computer.

05.0 DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURSHIP--The student will be able to:

- 05.01 Define entrepreneurship.
- 05.02 Describe the importance of entrepreneurship to the American economy.
- 05.03 List the advantages and disadvantages of business ownership.
- 05.04 Identify the risks involved in ownership of a business.
- 05.05 Identify the necessary personal characteristics of a successful entrepreneur.
- 05.06 Identify the business skills needed to operate a small business efficiently and effectively.

06.0 DEFINE THE PROCESSES RELATED TO INDUSTRIAL MATERIALS--The student will be able to:

- 06.01 Define "preprocessing."
- 06.02 Define "processing."
- 06.03 Define "postprocessing."

07.0 DESCRIBE PREPROCESSING ACTIVITIES AND PRACTICES--The student will be able to:

07.01 Describe the technical processes of extracting materials from natural resources.
07.02 Describe sources of standard stock materials.
07.03 Describe processes for transporting industrial materials.
07.04 Describe processes for storing industrial materials.
07.05 Describe industrial processes for protecting materials.
07.06 Describe precautions in receiving, unpacking, and handling industrial materials.

08.0 DESCRIBE PROCESSING TECHNOLOGIES AND PRACTICES OF INDUSTRIAL MATERIALS--The student will be able to:

08.01 Describe materials separating processes.
08.02 Describe materials forming processes.
08.03 Describe materials combining processes.
08.04 Describe materials conditioning processes.

09.0 DESCRIBE POSTPROCESSING TECHNOLOGIES AND PRACTICES OF INDUSTRIAL MATERIALS--The student will be able to:

09.01 Describe processes for distributing products made of industrial materials.
09.02 Describe processes for installing products made of industrial materials.
09.03 Describe processes for maintaining products made of industrial materials.
09.04 Describe processes for altering products made of industrial materials.
09.05 Describe processes for servicing products made of industrial materials.

10.0 PERFORM INDUSTRIAL MATERIALS PREPROCESSING SKILLS--The student will be able to:

10.01 Locate and order industrial materials.
10.02 Arrange for the appropriate transportation of industrial materials.
10.03 Store and protect industrial materials properly.
10.04 Follow proper precautions in the receiving, unpacking, and handling of industrial materials.

11.0 PERFORM TECHNICAL PROCESSING SKILLS WITH WOOD MATERIALS--The student will be able to:

11.01 Apply the technical processes of separating and forming wood materials.
11.02 Apply the technical processes of conditioning wood materials.
11.03 Apply the technical processes of combining in the fabrication and finishing of a wood product.

12.0 PERFORM TECHNICAL PROCESSING SKILLS WITH METAL MATERIALS--The student will be able to:

12.01 Apply the technical processes of separating and forming metal materials.
12.02 Apply the technical processes of conditioning metal materials.
12.03 Apply the technical processes of combining in the fabrication and finishing of a metal product.

13.0 PERFORM TECHNICAL PROCESSING SKILLS WITH PLASTIC MATERIALS--The student will be able to:

13.01 Apply the technical processes of separating and forming plastic materials.
13.02 Apply the technical processes of conditioning plastic materials.
13.03 Apply the technical processes of combining in the fabrication and finishing of a plastic product.

STUDENT PERFORMANCE STANDARDS — EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts — COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Materials and Processes — PROGRAM NUMBER: 8601100

COURSE TITLE: Intermediate Materials and Processes — COURSE NUMBER: 8601120

COURSE DESCRIPTION:

This course provides students with an expanded study and application of the knowledge, human relations, and technical skills of industrial materials and processes technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE MATERIALS AND PROCESSES LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safety standards.
- 01.06 Safely use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.
- 02.02 Participate as an effective team member.
- 02.03 Follow oral and written instructions.
- 02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

- 03.01 Apply basic English skills while completing selected written and verbal technological assignments.
- 03.02 Apply basic mathematical skills while completing selected technological assignments.
- 03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

10.0 PERFORM INDUSTRIAL MATERIALS PREPROCESSING SKILLS--The student will be able to:

- 10.01 Locate and order industrial materials.
- 10.02 Arrange for the appropriate transportation of industrial materials.
- 10.03 Store and protect industrial materials properly.
- 10.04 Follow proper precautions in the receiving, unpacking, and handling of industrial materials.

11.0 PERFORM TECHNICAL PROCESSING SKILLS WITH WOOD MATERIALS--The student will be able to:

- 11.01 Apply the technical processes of separating and forming wood materials.
- 11.02 Apply the technical processes of conditioning wood materials.
- 11.03 Apply the technical processes of combining in the fabrication and finishing of a wood product.

12.0 PERFORM TECHNICAL PROCESSING SKILLS WITH METAL MATERIALS--The student will be able to:

- 12.01 Apply the technical processes of separating and forming metal materials.
- 12.02 Apply the technical processes of conditioning metal materials.
- 12.03 Apply the technical processes of combining in the fabrication and finishing of a metal product.

13.0 PERFORM TECHNICAL PROCESSING SKILLS WITH PLASTIC MATERIALS--The student will be able to:

- 13.01 Apply the technical processes of separating and forming plastic materials.
- 13.02 Apply the technical processes of conditioning plastic materials.
- 13.03 Apply the technical processes of combining in the fabrication and finishing of a plastic product.

14.0 PERFORM TECHNICAL PROCESSING SKILLS WITH OTHER INDUSTRIAL MATERIALS SUCH AS COMPOSITE MATERIALS, SYNTHETIC MATERIALS, FIBERGLASS, GLASS, CERAMICS, CEMENT, PAPER, RUBBER, PETROLEUM, AND OTHER INDUSTRIAL MATERIALS--The student will be able to:

- 14.01 Apply the technical processes of separating and forming other industrial materials.
- 14.02 Apply the technical processes of conditioning other industrial materials.
- 14.03 Apply the technical processes of combining in the fabrication and finishing of other industrial materials.

15.0 PERFORM INDUSTRIAL MATERIALS POSTPROCESSING SKILLS--The student will be able to:

- 15.01 Install a product made of industrial materials.
- 15.02 Perform technical maintenance on a product made of industrial materials.
- 15.03 Plan and design a technical alteration in a product made of industrial materials.
- 15.04 Identify businesses that specialize in the technical service of products made of industrial materials.

17.0 OPERATE A COMPUTER UTILIZING A PROGRAM RELATED TO INDUSTRIAL MATERIALS--The student will be able to:

- 17.01 Collect or produce data on industrial materials or processes through the operation of a computer.

STUDENT PERFORMANCE STANDARDS — EFFECTIVE DATE: July, 1987

PROGRAM AREA: Industrial Arts — COURSE CREDIT: 1

PROGRAM TITLE: Pretechnical Materials and Processes — PROGRAM NUMBER: 8601100

COURSE TITLE: Materials and Processes - Individual Study — COURSE NUMBER: 8601130

COURSE DESCRIPTION:

This course provides students with an advanced study and application of the knowledge, human relations, and technical skills of industrial materials and processes technology.

01.0 USE PROPER AND SAFE PROCEDURES IN THE MATERIALS AND PROCESSES LABORATORY--The student will be able to:

- 01.01 Follow lab safety rules and procedures.
- 01.02 Demonstrate good housekeeping at work station and within total lab.
- 01.03 Conduct lab activities and equipment operations in a safe manner.
- 01.04 Exercise care and respect for all tools, equipment, and materials.
- 01.05 Identify OSHA color coding safety standards.
- 01.06 Safely use hand tools and power equipment.
- 01.07 Explain fire prevention and extinguishing safety precautions and practices.

02.0 DEMONSTRATE POSITIVE HUMAN RELATIONS AND LEADERSHIP SKILLS--The student will be able to:

- 02.01 Perform roles in a student personnel system or in the Florida American Industrial Arts Student Association.

02.02 Participate as an effective team member.
02.03 Follow oral and written instructions.
02.04 Work cooperatively with others.

03.0 APPLY BASIC SKILLS IN ENGLISH, MATHEMATICS, AND SCIENCE APPROPRIATE TO TECHNOLOGICAL CONTENT AND LEARNING ACTIVITIES--The student will be able to:

03.01 Apply basic English skills while completing selected written and verbal technological assignments.
03.02 Apply basic mathematical skills while completing selected technological assignments.
03.03 Apply basic science principles, theories, laws, and procedures while completing selected technological assignments.

16.0 PERFORM ADVANCED STUDY AND TECHNICAL SKILLS RELATED TO INDUSTRIAL MATERIALS AND PROCESSES--The student will be able to:

16.01 Select an individual or group project in cooperation with the teacher.
16.02 Develop a written plan of work to carry out the project.
16.03 Show evidence of technical study in support of the project.
16.04 Perform skills related to the project.
16.05 Complete the project as planned.

17.0 OPERATE A COMPUTER UTILIZING A PROGRAM RELATED TO INDUSTRIAL MATERIALS--The student will be able to:

17.01 Collect or produce data on industrial materials or processes through the operation of a computer.

18.0 PERFORM MATERIALS TESTING SKILLS--The student will be able to:

18.01 Perform technical destructive tests on industrial materials.
18.02 Perform technical nondestructive tests on industrial materials.

19.0 PERFORM A MATERIALS PROCESSING OPERATION USING A CNC (COMPUTER NUMERICAL CONTROLLED) MACHINE--The student will be able to:

19.01 Separate, form, or combine a part or subpart of a project using a CNC machine.
19.02 Interface a CNC machine and a robotic arm to perform automation processes.

20.0 CONDUCT A RESEARCH AND EXPERIMENTATION PROJECT ON AN INDUSTRIAL MATERIAL OR PROCESS--The student will be able to:

20.01 Identify a problem.
20.02 State a need to research the problem.
20.03 Form a hypothesis about the problem.
20.04 Plan the procedures for researching the problem.
20.05 Conduct the research following the planned procedures.
20.06 Present the research findings in a seminar.
20.07 State conclusions based on the research findings.